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# THE JOURNAL

OF THE

## American Medical Association

Annual Subscription, $5.00 | PUBLISHED WEEKLY | Single Copies, 15 Cents

VOLUME 73, No. 21 | 535 North Dearborn Street, CHICAGO, ILL. | NOVEMBER 22, 1919

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Entered as Second-Class Matter, June 25, 1885, at the Postoffice at Chicago, Illinois, under Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917, authorized on June 14, 1918.

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# The Journal of the American Medical Association

**Published Under the Auspices of the Board of Trustees**

VOL. 73, NO. 21 CHICAGO, ILLINOIS NOVEMBER 22, 1919


## THE SKIN: A MIRROR TO THE SYSTEM


M. F. ENGMAN, M.D.

ST. LOUIS


I fear that the dramatic title of this discourse is rather misleading. I do not mean that the skin, as an organ, is of universal diagnostic value in relation to internal disorders. What I mean is that the skin may be of great diagnostic assistance in many groups of general conditions or diseases. In other words, it may reflect, as a mirror, certain fundamental truths relative to the pathology of diseases in general.

Dermatology, since the time of Hebra, has become a study of morphology. The lesions seen on the skin have been studied both histologically and clinically, generally without regard to the underlying connection they may have with any other organ or system whatsoever. Most of the literature on skin diseases consists of a clinical description of the disease and its histologic character. This custom has been extant for the past sixty years, and it has been only in the past few years that the proper study of certain diseases of the skin has been undertaken.

Leloir remarked some thirty years ago, in his graphic French way, that the skin was a mirror to the system, that is, certain signs and symptoms on it could be used, when properly understood, in the diagnosis of many systemic conditions.

Skin diseases are usually treated in the outpatient departments of hospitals and universities, without any direct connection with the departments of internal medicine. Those limiting their practice to diseases of the skin are apt, through routine and training, to pay attention only to the treatment of objective lesions on the skin, and in the very nature of this practice are not enabled to follow the case into the intricate mazes of internal or systemic conditions to which it may lead.

No one can properly study diseases of the skin and have a comprehensive knowledge of their pathology unless he is enabled to study profoundly all conditions relative to the case. This can be accomplished only in a well regulated and well equipped general hospital in which the full clinical data relative to the patient, or case, may be worked out; where he can have the cooperation of a trained internist and all of those facilities which constitute the conditions for proper clinical study.

During the past few years there have been signs of revolution in the present status of diseases of the skin, which has been brought about by the modern methods of diagnosis and clinical study.

The skin is obviously an organ of the body, as much so as the liver or kidneys, and is subject to the same laws of health and disease as those that govern the other organs of the body, the only difference being its exposed and external position. It receives its nourishment from the blood stream and is, therefore, affected as any other organ might be from anomalous conditions as to quality and quantity of the constituents of this fluid. It is affected, as any other organ, by the nerves and vessels of the body. Therefore, through this intimate internal relationship, the study of the changes that occur on the skin may prove of great assistance in the proper understanding of various systemic constitutional conditions.

This subject naturally embraces such a large field that it would be impossible in a short discourse to cover all of it. My plea is more for the purpose of drawing attention to a few striking groups of diseases in which the skin is of the greatest diagnostic assistance and importance.

For the purpose of discussion I will divide the subject roughly into, first, inherent factors that point to certain constitutional conditions, and second, blood-borne conditions which affect the skin.

### INHERENT FACTORS

Any one who has studied the pathology of skin diseases for a number of years must recognize the fact that there are certain inherent conditions in the skin, congenital or inherited, which, when understood, throw a flood of light on the proper understanding of the patient as a whole. Take, for instance, the early manifestations of that condition known as exudative diathesis, which appears very early in life and marks the infant a clinical entity, the first symptom of which is eczema. This is seen on the cheeks or body to be followed all through life by adenoids, asthma, bronchial conditions, and enlarged glands, and tells the observer, in unmistakable language, the phases of the pathologic conditions through which the patient will pass. This type of individual frequently never changes, and may be pursued throughout life with recurrent respiratory inflammations. Sensitization in infancy may be at the bottom of this condition. Improper feeding may show itself on the skin by a dry, scaly condition which may induce traumatic eczema. Heaping up of cells about the follicles on the extremities may point in early life to hypothyroidism.

How graphically may presenility be shown in those changes seen on the skin in the disease known as xeroderma pigmentosum. Although the disease is said to be due to the effect of the actinic rays of light on the skin in these persons, yet their skin is a senile skin. A senile skin at the age of 8 or 10 years does not differ fundamentally from that of an old man or of one

burned by constant exposure of the roentgen ray. This disease first shows itself by exaggerated freckles, followed by marked pigmentation, telangiectases, atrophy and, finally, the formation of carcinoma which frequently metastasizes. This skin is an old skin, and the person it covers is fundamentally senile. The signs and symptoms on the skin of these patients give one at once a clew to the equation of the individual.

Age, although usually computed by time and years, is indicated more on the skin. A man is not only as old as his arteries but also as his skin. The skin shows the first signs of senility, whether thirty or eighty years have passed since birth. These indelible signs of life-wear are seen first on the exposed surfaces and on the chest, in the form of atypical cornifications of the epidermis called keratoses senilis, of persistent freckles which do not disappear during the winter, discolored areas of the skin, and, finally, the wrinkled, atrophic appearance seen in old age.

It is curious to note how early these senile cutaneous changes occur in certain families, and usually they are seen in those who are prematurely old at 40. The skin on the back of the hand is a true gage as to the wear and tear of the body in relation to years.

The earliest signs of approaching puberty are seen on the face, indicated by the little comedo on the cheeks or nose and the increased oiliness of the skin in that region. The comedo and a mild or severe degree of the so-called oily seborrhea are as truly secondary sex characteristics as the appearance of hair on the pubes or face. They signal a systemic change, the awakening of a new phase of life, a chemical and physical change. Yet we are taught to look to the diet as the cause of oily seborrhea and the blackhead. That some systemic hormone has affected intrafollicular conditions and the fat metabolism of the epidermis is the only modern biologic explanation.

Acne vulgaris sometimes follows, with a lesion whose histopathology demonstrates its bacillary origin as truly as the miliary tubercle of tuberculosis is of bacillary origin. Yet we are taught to look to the diet with this histologic evidence before us. Dietetic or food-produced lesions, or, rather, lesions produced by chemicals (foods) taken into the alimentary canal or introduced parenterally, belong to the large erythema group and do not produce the organized inflammation, almost of a granulomatous character, seen in acne vulgaris. The intrafollicular flora is awakened into new life by a chemical change in the body; and not only this, but the follicle and the individual also enter a new phase of existence; the oily seborrhea, the comedo, and the acne vulgaris signal this change.

### BLOOD-BORNE CONDITIONS

The inherent and physiologic conditions reflected by the skin are many; but we must consider the more important blood-borne conditions. The anomalous action of the ductless glands is frequently the cause of changes in the skin in the form of telangiectases, pigmentations, dryness, scurfiness, darkening, etc.; all of which is well known in medicine. We will dwell, however, for a few moments on hypothyroidism, a subject which I have had unusual advantages in studying from a purely dermatologic standpoint.

The thyroid gland secretes several definite chemical compounds, each with a specific office as demonstrated by Kendall. I had arrived at this conclusion years ago from the experimental study of obvious hypothyroid phenomena on the skin. Experimental thyroid feeding with the various thyroid preparations on the market demonstrated plainly the necessity of more exact specific preparations as, in a certain type of cutaneous change, thyroid feeding in certain cases would produce only a degree of improvement, while on increasing the dosage, untoward vasomotor and cardiac symptoms of hyperthyroidism would interfere. With Kendall's "Thyroid 'B'" in which the vasomotor element was omitted, uniformly definite results were obtained. "B" of Kendall contained only the element which specifically affected the skin, at least, that was the obvious clinical conclusion.

The cutaneous symptoms of hypothyroidism are diagnostically more valuable than the reduction tests, the pulse, or any of the vague systemic symptoms. Sometimes the only symptoms are the skin changes:

1. There may be a dryness and scurfiness of the skin, frequently associated with pruritus.

2. A shriveled presenile appearance of the skin as a whole may exist, differing from other types of presenility in that the changes are more marked on the covered portions and on the palms and soles. The skin over the covered portions is more deeply lined, somewhat finely striated, of a very pale pear-gray, dry, maybe scurfy, and soft. The palms and soles are characteristic, dry, maybe fissured, the lines of the fingers and palms greatly multiplied by deepening of the furrows. Such a palm would puzzle a palmist. The skin of the dorsum of the foot is sometimes slightly atrophic.

3. There may be an erythema of a deep red to purplish hue on the nose and cheeks, curving downward around the corner of the mouth onto the chin. This area may be studded with small, fine, scaly papules due to secondary infection. The face is full and round, and the cheeks are prominent.

4. Myxedematous pads may be found in the supraclavicular depression. These are small, raised, tumor-like hemispheres, resilient to the touch. They may vary daily in size. Their peculiar resilience differentiates them from fat. Such pads may be found elsewhere on the individual, quite frequently on the arms, as occurred in a brother and sister in our series of cases. They can easily be discovered by careful palpation.

5. There may be loss of hair, particularly about the temples. The hair is dry and lusterless.

6. A sharply defined seborrhea-like dermatitis of the head, neck, face and chest may be present. The process stops abruptly just below the clavicle in a curved line, curving convexly upward and backward from the front to join the area from behind at the base of the neck. This type of marked dermatitis I have seen disappear again and again under proper thyroid therapy. It is usually accompanied by patches in front of the elbows and behind the knees. Other symptoms of hypothyroidism are usually present: headache, slow pulse, forgetfulness, pain in the back, slight resistance to cold, etc.

7. Pigmentary anomalies are frequently the sign of thyroid disturbance as well as that of other glands, the suprarenal glands, for instance. The thyroid pigmentations may be: in children, a slight deepening of pigment in a broad band about the neck, the deepening of color sharply defined; a similar deepening to a light café au lait tint about the trunk, *en cuirasse;* a darkening of the whole skin to a deep pearly or dirty, unhealthy, bluish gray, or a changing of the skin to a "skimmed milk" tint.

8. A scurfiness of the elbows and knees, when accompanied by the palmar and plantar changes, is characteristic of hypothyroidism in those past 30.

9. Acquired ichthyosis or ichthyotic-like changes appearing after puberty reflect thyroid deficiency.

When we say thyroid deficiency we do not know what we mean, and most frequently we do not obtain successful results from our present methods of thyroid feeding, as no one knows what specific elements are

contained in the products at present on the market. Therefore, a therapeutic test at present is misleading and frequently unsatisfactory. Exact, specific thyroid feeding, from the standpoint of Kendall, is needed.

### OTHER BLOOD-BORNE REFLECTIONS ON THE CUTANEOUS MIRROR

*The Erythema Group.*—This group of skin diseases, including urticaria, angioneurotic edema, erythema multiforme, erythema nodosum, scarlatiniform erythemas, purpuras, certain cutaneous gangrenes and Raynaud's phenomenon, possibly certain types of pemphigus, dermatitis herpetiformis, and lupus erythematosus, is the most fascinating and alluring of all groups of skin diseases, because modern medical illumination has flashed its rays on the mirror. Our writers have not as yet seen the light relit by Osler through his epoch-making study of this group. That lesions of the erythema group were not infrequently pathognomonic of grave systemic disorders antedated Osler's observations, but the glow was dim, indistinct, flickering. Osler relit the light, trimmed it, and held it aloft.

The erythema group is always deserving of careful study and thorough clinical investigation, no matter in what eruption or form it may present itself on the skin. The eruption is always produced by something brought to the skin by the blood stream: a chemical which may produce a wheal or a papule, a tubercular lesion, a spreading plaque, a hemorrhage, gangrene or a node, through local vascular effect or an interference, physically and chemically, in the nutrition of one or more extremities—so-called Raynaud's disease. Similar results may be produced by embolic foci of micro-organisms brought to the skin. The offending chemical may come from numerous sources: a foodstuff rendered innocuous through sensitization, foreign serums parenterally introduced, focal sites of infection, drug sensitization, acute invasion of micro-organisms, as in the infectious diseases, etc. The study of an individual case presenting an eruption belonging to the erythema group is a task of no mean importance.

Many of the symptoms of this group are due to direct embolic disturbance of the skin by micro-organisms. A simple urticaria relieved by diet and salts is a therapeutic triumph; but how often do we obtain such results in other types of eruption belonging to this group? With recurrent erythema multiforme we are not so fortunate. The latter means a study which will tax all departments of clinical research. Cultural investigation may disclose a micro-organism in the general circulation when an aortic murmur may be well established or be just beginning. Sensitization tests may demonstrate a condition of allergy; the roentgen ray, an old appendical trouble; the dentist, an involved root; but this is rarely a factor; and so on.

Minute petechial hemorrhages about the edge of the lobe or concha of the ears, in the gluteal folds, in the tips of the fingers or toes, points always to emboli of *Streptococcus hemolyticus* and, not infrequently, these petechiae are associated with erythema multiforme, urticaria or angioneurotic edema.

In studying the erythema group it is well to remember that many organisms beside the spirochete of syphilis remain, we might say, latent in the system. This explains many of the recurrent, relapsing forms classically described by Osler. I have had the advantage of following several cases to the end. The most murderous of the class of cocci that lurk in the system to appear probably at intervals in the blood stream is *Streptococcus viridans.*

This organism may not infrequently in its insidious invasive stage cause some type of erythema multiforme or urticaria; but I have never seen any eruption after the constitutional symptoms became constant. In one striking case from an old mitral lesion the new blood systemic invasion evidently began, ushered in by an urticaria, with some lesions characteristic of erythema multiforme. The subsequent course of the disease presented no cutaneous disturbance. *Streptococcus hemolyticus,* on the contrary, induces purpuric lesions with no inflammation or, at least, with very mild inflammatory phenomena, and gangrene is the frequent associate.

A child enters the hospital with erythema multiforme, purpura, or one of this group. It may or may not have intestinal crises or rise of temperature. A short sojourn effects a symptomatic cure, yet the child deserves watching unless the etiologic factors in the case have been convincingly demonstrated. Negative blood cultures are not convincing. A mitral harshness may be mistaken for an anemic murmur when it may be the incipient stage of a building colony on the valves. An erythema multiforme at 10 and 12 may explain the patient's death years after. Syphilis is not the only eruptive disorder which delays its sting for years.

I have seen the sting delayed for thirty-five years in a case of cutaneous gangrene with Raynaud's disease. To the surgeon this group is extremely important. How chagrined he must feel who has opened an abdomen in a case of Henoch's purpura; and it has happened many times and unavoidably, too. I remember a clever surgical friend sitting with a child writhing with abdominal pain, believing and hoping for an eruption which finally appeared on the skin—it was measles.

Again, an old inflamed appendix may produce an eruption. The blood count is then of great value.

One can readily discern, I hope, from this short sketch of the erythema group how important it is, into what mazes of clinical research it leads, and how fascinating is its elucidation. Dermatologists since the time of Hebra have treated these different types of eruption as clinical entities, have named them and labeled them as such. It is a rule of nature to reestablish an equilibrium; therefore, these eruptions may, and do, disappear, and in the great majority of instances their true pathology is never known, just as the eruptions of syphilis disappear, but not the disease.

Lupus erythematosus, whose eruptive phenomena frequently occur as one of the types of the erythema group, is, in a large percentage of instances, accompanied by tuberculosis, and may be pathognomonic of that disease.

Dermatitis herpetiformis, a type of eruption quite characteristic, often shades into the erythema group in some of its eruptive varieties, and is always a symptom of some systemic toxemia. It may be reproduced in certain individuals by drugs—iodids, for instance. To me, it is generally an indication of intestinal toxemia; yet other sources for toxic bodies may be found. Vaccination connects this group, in a symptomatic way, with pemphigus. How characteristic to the trained dermatologist is postvaccinal pemphigus. Yet we see exactly similar eruptions with which vaccination cannot be connected. Reasoning, therefore, from analogy

on objective grounds, pemphigus is loosely related to the erythema group and is undoubtedly pathognomonic of some blood-borne principle—a chemical (toxin) or micro-organism. The kidney disturbance accompanying these variously named eruptions is significant. When death occurs from the continuous action of these agents which induce the disease, it is usually due to exhaustion or terminal infection.

The papulonecrotic tuberculids which occur most frequently in childhood and adolescence are fast attaining their true position as diagnostic signs of great value. Pediatricians are recognizing this. The skin in this instance reflects the individual's true biologic relationship to the tubercle bacillus as the tertiary lesion of syphilis does to *Spirochaeta pallida*. These lesions, as demonstrated by Rist and Rolland, indicate a condition of allergy to the tubercle bacillus. They are spontaneous examples of Koch's phenomena and are produced by endogenous reinoculation from some active or latent foci of tuberculosis within the system—blood-borne emboli of live organisms.

The terrific immunizing forces set into operation by the bacilli at once destroy them and incidentally produce the tuberculid seen on the skin as papules or nodules—a mass of cells which are, more or less quickly, absorbed. The type of tuberculid depends on the location of the reaction in or under the skin or in the vessels in or under the skin, most of them being fundamentally and, in their incipiency, vascular in origin. Other organisms beside the tubercle bacillus may produce similar lesions, as in the condition known as erythema nodosum. Rist remarks:

> It is impossible to reflect on the anatomical and clinical evolution of human tuberculosis without meeting the problems raised by the study of the tuberculids, and one must recognize that no general conception of tuberculous infection will be legitimate if it does not take into consideration the question of the tuberculids and fails to give a satisfactory explanation of them.

The lesions produced by this terrific reaction to the bacillus may occur in the form of disseminated lesions, as small papules or large gummatous masses, especially marked on the lower limbs. They always heal readily under rest and proper food. The type known as erythema induratum of Bazin is frequent in young girls from the large shoe factories in and about St. Louis.

Raynaud's disease, portrayed for years as an affection or disturbance of the so-called vasomotor system, is rapidly losing this position as the light of careful clinical research illuminates these dark recesses. In fact, formerly, the whole erythema group was attributed to the effect of some toxin acting on the vasomotor nerves and centers. Prince Morrow's book on "Drug Eruptions" may be epitomized as the effect of the offending drug on this system. The vasomotor system has been a family hat rack on which our dermatologic family has hung anything we could not find use for otherwise. It is a cloak, a waste basket.

The experiments of von Duhring, Phillipson and Gilchrist in their investigation of urticaria, the fundamental lesion of all blood-borne phenomena on the skin, when grasped, convince one at once of the inflammatory nature of these lesions, and divorces them forever from their supposedly vasomotor origin. These investigations demonstrated beyond a doubt the local action of some poison or agent, at the site of the urticarial lesion, which set in operation terrific forces, local in action.

By discarding this warm and comfortable cloak, the vasomotor theory, the investigation into the fundamentals of all of the blood-borne group of eruptions will take on new vigor, virility and daring. So it is with Raynaud's disease—critical investigation most frequently tears away the cloak and removes it from the vasomotor phenomena and places it with the vascular obstructions, obstructions of the vessels by spirochetes, tubercle bacilli, streptococci, or any other organisms.

*Group in Which the Palms and Soles Are of Diagnostic Assistance.*—The plantar surfaces of the feet and the palmar surfaces of the hands are of inestimable value and assistance in the diagnosis of certain diseases, particularly (1) hypothyroidism, (2) arteriosclerosis and (3) diabetes. Hypothyroidism has been described. Thickening of the epidermis on the soles of the feet, especially about the heel, with a skin of dry and calloused appearance is very suggestive of diabetes. Frequent vesication with a tendency to localized necrotic areas is quite characteristic. All of the local symptoms on the palms and soles may be attributed to nutritional changes from thickened vessels. In diabetes, the local changes do not occur until late—after arteriosclerosis has begun. These blisters and epidermic thickenings not infrequently signal the débacle in these cases.

Xanthoma tuberosum and xanthoma diabeticorum are well known. Xanthoma striae on the palms and soles are often the earliest symptoms of diabetes, especially in the young. Pollitzer and Udo Wile were the first to introduce into dermatologic literature the true significance of those yellowish tuberous lesions about the joints—called xanthoma tubersum multiplex. The lesions on the skin merely reflect, at points of irritation and frequent motion, the condition of the blood which contains in excess cholesterol—fatty acid esters which irritate and infiltrate the cells. Similar deposits are found in other organs on the body, especially the heart. Xanthoma diabeticorum is probably an acute type of the same process, associated with sugar in the urine.

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## OUR BLINDED SOLDIERS

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The observations on which this paper is based are drawn from studies made of the men in U. S. General Hospital No. 7, while I was psychiatrist to that institution. The men totally or practically blinded in the American Expeditionary Forces, as well as those losing their sight elsewhere in our army and navy during the war, were sent to this hospital. Hospital No. 7, "Evergreen," is situated on a large suburban estate, giving a country environment. At the time my notes were taken, the handsome residence was used for those patients needing hospital care, while the other blind men were housed and attended the classes of the educational department in barrack buildings on the grounds a short distance from the hospital.

My conclusions are drawn from a series of 115 patients. Of these, seventy were blinded by high explosives, twelve by machine-gun or rifle bullets, and six were gassed. There were five cases resulting from epidemic meningitis, five from syphilis, one from

gonorrhea, and four from degenerative processes, probably specific. There were four cases of retinitis pigmentosa, two of glaucoma, and there were six resulting from various other causes—infections, accidents, etc. I am indebted to Lieut. L. G. Campbell, ophthalmologist to the hospital, for ophthalmologic data referred to in this paper.

The average age of these men was 25, the oldest being 36, the youngest 17. With the exception of five, they were American born. They were for the most part sturdy individuals. The majority of them had grown up on farms and were members of rather large families. Their average attainment in school was the seventh grade; fifteen had had some high school training; one could not read or write; three had had college training. The apparently medium grade of educational attainment was not due to inferior intelligence but to the fact that so many men, growing up on isolated farms and having to work in the winter, had had only limited advantages of short-term schools. On the whole, these were intelligent, practical boys of good judgment, from whose heredity and environment we would expect a stable nervous system, and in whom we would look for an average healthy reaction from the shock of the western front. Most of these soldiers participated in some of the most terrible fighting of the war. A goodly number had been cited for special bravery.

The studies were made, generally speaking, from three to four months after the date of the original injuries, and after previous hospital treatment had been received. The acute symptoms had, therefore, largely subsided. My diagnoses were based on the histories elicited and on the present condition of the patient.

### REHABILITATION PROGRAM

General Hospital No. 7, in addition to providing hospital and purely medical care for the men, also carried out an extensive educational and rehabilitation program. The work of the two departments was, of course, closely interrelated; and an important function of the psychiatrist was that of advising in the assignments to be given the men, so that their work in kind and amount might be that for which they were best qualified in every particular, especially from the standpoint of their state of health and mental makeup. In these pages I have presented, first, the more definitely psychiatric conditions encountered at Evergreen, and later have briefly reviewed the kind of life one found there among the men—the men often referred to as sightless, but who themselves always spoke of seeing as naturally as though their eyes still existed intact.

### TYPES OF CASES

There were forty-two concussion cases. In three of these the injuries were received outside of actual warfare, as a result of explosions—one from a torpedo and two from dynamite explosions in government construction work. The loss of the eyes in all but five of the concussions was due to high explosives. The eyes were destroyed in a few cases apparently from the violent concussion alone; but generally from penetrating wounds caused by shrapnel entering one side of the face, or one orbit, and making its exit on the opposite side. In cases of the destruction of the eyes by rifle or machine gun, the bullet followed a similar course. In the five cases above excepted, blindness was brought about in this manner. It must be borne in mind that in addition to the atmospheric changes which are a most important element in the production of concussion, we have in these cases the direct effect on the brain by the shrapnel, or bullet, crashing through the eye structures themselves; and through the bony structures, of and about the orbits, which are in direct contiguity to the brain.

In all these cases in which violent trauma occurred, shock was present in varying degree. Thirty gave a history of unconsciousness. But it is difficult to say just what part was played in the disturbances of consciousness by the element of shock. We do not know to what extent in certain cases there may also have been organic damage to the brain. The portion of the brain in which this damage was most likely to occur was the lower frontal lobes, especially the inner depressed portions around the olfactory bulbs and tracts where definite neurologic sequelae would be lacking—except in the case of the sense of smell. Furthermore, because of the complicated nature of the bony structures about the anterior portion of the base of the brain, through which the bullet or fragment often passed, it is doubtful if in many cases roentgenography would reveal the fracture causing the brain damage. Several of the men gave a history to the effect that a portion of the brain substance had been exposed by reason of the injury.

In nineteen of the concussion cases the sense of hearing was affected, varying from a ringing in the ears, and slight deafness, to complete deafness on one side, and rupture of the tympanum in a few cases. This large proportion of auditory disturbances is a natural accompaniment of a group of concussions due to high explosives.

The sense of smell was affected either temporarily or permanently in sixteen of the concussions. In those cases in which both eyes were destroyed by the flying fragment, the ethmoid bone was usually shattered in its cellular portion, but at times through the cribriform plate as well, the latter being the most likely mechanism in the cases of complete anosmia.

The sense of taste was either destroyed or impaired in seven of these cases. This finding at once brings up the question as to how the lesions in these particular cases brought about damage to the sense of taste. We know that the chorda tympani carries the fibers for the sense of taste of the anterior two thirds of the tongue; but the further path of these fibers, to the brain, is still open to question. Erb, with others, maintains that this further path of the taste fibers is through the facial by way of the large superficial petrosal nerve and Meckel's ganglion into the second branch of the trigeminus to the brain. Meckel's ganglion lies in the upper part of the sphenomaxillary fissure, which opens into the floor of the orbit; and this fact affords an explanation of the pathologic conditions in those cases in which the floors of the orbits were fractured with injury to Meckel's ganglion, and consequent interruption to the path of the gustatory fibers. The tips of the inferior temporal lobes where the middle fossae constitute part of the walls of the orbits were in some cases in the path of injury. For this reason we must consider the possibility of damage to the motor cortical centers of taste and smell which have been charted just behind this area.

In twenty-five of the forty-two cases of concussion, operation was performed within thirty-six hours following the injury, thus imposing the additional trauma

of operation, and, in many cases, the toxicity of anesthesia. In some instances the operative element prolonged the period of unconsciousness and exaggerated the subsequent disturbed mental state.

### CASES ILLUSTRATIVE OF THE CONCUSSIONS

Case 1 (47).—The patient, aged 20, was blinded by a high explosive shell at Soissons in September, 1918, receiving at the same time wounds in left side of face and in right arm. This patient has no recollection whatever of his injury, and remembers nothing of events for a week or more preceding it (retrograde amnesia); and for the month following his memory is also a blank. The amnesic period was followed by several weeks during which he could not remember the names of people, nor call objects by their right names (paramnesia). He suffered from insomnia, was highly sensitive to noises ("jumpy"), was very restless, and was unable to fix his attention. This motor restlessness is still present seven months after the injury; and his taste and smell seem permanently damaged. We have been unable to induce this man to avail himself of any of the advantages of the educational department in either mental or manual training. He roams restlessly from building to building; is alternately jovial, and irritable or dejected; in a rather good natured way he is always dissatisfied, wanting to be some place where he is not. He has only slight insight into his condition. I found his deep reflexes all exaggerated. This is a case of brain concussion of moderate grade in which mental deterioration will progress.

Case 2 (4).—The patient, aged 27, was blinded in October, 1918, by a high-explosive shell on the Verdun front, sustaining at the same time an additional head wound and injuries on the left arm and left hip. There was a history of unconsciousness extending over a period of weeks. When I saw him four months later he was still bedridden, and confused as to time, place and persons. He was extremely weak and emaciated. He was in a semistuporous state much of the time. At times he would lie humming the same tune over and over, or laughing to himself. His memory defect was very marked. He would forget in the middle of a conversation that he was being talked to, and would ask irritably why no one was there. This patient improved to a noticeable degree physically, but his mental defect was still very marked seven months after his injuries. His elbow and knee jerks were exaggerated and were greater on the right; there was ankle clonus on the left;. the pulse was 96 (in bed). The picture was that of definite mental deterioration following brain and cord concussion—moderately well marked dementia. This case represents a severe grade of concussion.

Case 3 (32).—This patient, aged 34, was blinded in September, 1918, by a high-explosive shell on the St. Mihiel front, receiving at the same time wounds in the face (four upper teeth being knocked out) and in the left shoulder. He was wounded while on patrol duty, being one of a party of four who took a German dugout. "I crawled into one of the bunks, and a fellow got into the bunk over mine, and it sprung a trap. . . . I am the only one of the four left." He gave a history of bleeding from the ears following the injury, and a discharge from them for six months. He felt numb all over following the injury; he turned his gun on himself, but "the trigger wouldn't work." He walked a half mile and then lost consciousness; he was unconscious for two days. His unconsciousness was followed by confusion that lasted two weeks. He dreamed for many weeks of "going over the top"; and depression was extreme. This patient is still (seven months after injury) troubled by noises, is somewhat depressed, and tires easily. "When I am in school trying to make good I go all to pieces. . . . I can't stand music either; when the fellows talk I think I'll go crazy. . . . I was never like this before I was hurt; a fellow who gets a bump like that isn't in his right senses." The elbow jerks are normal; the knee jerks are about normal but slightly more active on the right.

This patient is an exceptionally fine type of man, courageous, modest, naturally well poised, a Westerner of splendid physique. He has stuck to braille with unusual persistence. In spite of this soldier's inherent health and vigor and his force of character, the shock that his nervous system has sustained has permanently reduced his ability to withstand strain. This is a case of concussion followed by marked neurasthenic symptoms.

### DIFFERENTIATION OF SYMPTOMS

It is manifestly impossible when the trauma is so overwhelmingly physical to differentiate etiologically symptoms specifically dependent on concussion from those purely neurasthenic in nature. Observation over a long period would often be necessary for a satisfactory differentiation. In thirty-seven of the forty-two concussion cases, there developed a condition showing symptoms indicative of neurasthenia, in addition to symptoms such as the following more definitely characteristic of concussion: inequality and increase or decrease of the deep reflexes, dizziness, vomiting following injury, ringing in the ears and discharging ears, bleeding from the nose and ears, unconsciousness, pain in the head, and delirium. In those cases in which I made a diagnosis of neurasthenia in addition to that of concussion, there were found symptoms such as hypersensitiveness to sounds—"jumpiness"—dreams of the battle field, motor restlessness, paresthesias, and increased reflexes. The majority still presented, when coming under my observation, evidences of vasomotor weakness (lividity, tachycardia, lowered surface temperature, clamminess of extremities), and in a large percentage, muscular tremor.

I am impressed by the importance of being cautious in giving a prognosis for complete recovery in these cases of concussion. It is necessary to bear in mind that while, in some instances, return to physical health may be permanently maintained, in a fair number this apparent recovery may be succeeded by a slowly progressive deterioration. In all the severe cases I believe ability to withstand mental or physical shock has been permanently lowered.

Of the entire series (115 cases) fifty patients suffered from well marked symptoms of neurasthenia; four of these had not been subjected to actual warfare. The concussions, as has been stated, contribute thirty-seven of these neurasthenia cases. In addition to the fifty mentioned above, twenty-eight presented mild symptoms that were regarded as neurasthenic in nature. The term neurasthenia is used here as designating a state of exhaustion dependent primarily on such causes as physical trauma, concussion, shock, prolonged fatigue, infections, etc., alone or variously combined.

### CHARACTERISTIC SYMPTOMS

Symptoms characteristically found in the neurasthenic group were, in the milder cases: transient depression, mild anxieties, fatigability, restlessness, insomnia, irritability, etc. In the moderately severe cases these symptoms were exaggerated and prolonged; and the depression sometimes carried the patient to the point where suicide was contemplated. Nostalgia in an exaggerated form often existed. Dreams of fighting in the trenches occurred. In these moderately severe cases, recuperation was slow, and clearly defined symptoms were still present when I saw the patients several months after the original trauma. Many showed, at this time, moderate lividity of the extremities and increased activity of the heart. Prognosis generally was good. In the severe types of neurasthenia the neurocirculatory asthenia was more grave; muscular tremors, tachycardia, palpitation, hyperhidrosis, and

increased reflexes were more in evidence. In this severe group, we find those patients who passed through marked anxiety states; sleep was disturbed for many weeks by dreams of fighting; many suffered from extreme exhaustion; in a few the neurasthenic state followed a prolonged period of amnesia or of delirium. Prognosis for complete recovery in the majority of this group is doubtful; in some, prognosis is definitely bad.

In some of these cases the term hysteroneurasthenia was used in the diagnosis to characterize the emotional element figuring in the syndrome. A fact noticed in these hysteriform syndromes was that in every instance the patient was constitutionally more or less unstable emotionally. On taking reflexes one met an overreaction in which there seemed to be a voluntary element. These men were overfearful during examinations. They were often distrustful and querulous. It must be understood that the symptoms in this group were not major manifestations of hysteria.

### DIAGNOSTIC VALUE OF ATTITUDE TOWARD BRAILLE

I have disregarded, in these tabulations, psychasthenia as a distinct diagnostic entity. A disturbed psychic condition necessarily exists in neurasthenia, and is more or less coextensive with the state of prostration. One of the evidences that I found of considerable importance in estimating the degree of mental inadequacy, or psychasthenia, was the ability of a man to apply himself to the study of braille, a system of raised characters by which, through his sense of touch, a blind man reads, and which is more of a tax on attention than typewriting or the other curative or educational work given to the blind soldiers at Evergreen. In certain cases this study seemed to cause especial distress and irritation. "I can take anything but braille; not braille, braille drives me crazy." This attitude toward braille varied with the severity of the neurasthenic symptoms. The memory-association with this particular work, when it had been inopportunely urged on the patient, was in some cases so disagreeable as to prevent the resumption of this necessary study, even after sufficient recovery had been made for the men ordinarily to take it up without nervous strain. On the whole, the reaction toward braille, presenting in fair measure the degree to which these men were able to exercise their mental faculties, supplied an important diagnostic aid in estimating the extent of nervous shock sustained. In marked contrast to those reacting psychasthenically toward braille stood out the small number of sturdy individuals who found little or no difficulty in keeping up the sustained attention necessitated by this study.

### INFREQUENCY OF SYMPTOMS OF MAJOR HYSTERIA

An interesting fact found in these cases is that in only two of the series of 115 did the condition presenting seem to be symptomatic of major hysteria. In one of these patients, a negro, aged 23, a typical "shell shock" condition arose a month previous to the time his blindness came on. This patient said he was "scared" all the time he was in the trenches. He related that his "shell shock" followed the explosion of a shell near him, though he "was not injured." He stated that for a half day following this he "couldn't tell what was going on, or what people were saying." He has been "kinda mixed up ever since." He related that he stuttered for two days. This patient still stutters (seven months later) when excited. After this experience he was more than ever frightened, and his sleep was disturbed by dreams of fighting. This fear continued until he got away from the sound of the guns a month later. At this time he was taken sick with fever and headache. His vision failed and he was sent back to a hospital, where a month later one eye was enucleated. He was greatly depressed. The ophthalmologist's diagnosis was acute glaucoma. Six months later, examination revealed general hyperalgesia, with hysterical weakness of the left side of the body. This man had had pleurisy on the left side three years before going into the service. The knee jerks were minus; the elbow joint plus; there was tremor of the tongue and a pulse of 120 (sitting). The patient was overfearful during the examination.

The second patient with hysteria was a musician, aged 24. He was gassed but not sufficiently to account for the optic atrophy that was afterward discovered. There is a history of blood and spinal fluid examination; following lumbar puncture his right leg was paralyzed for three days; then it became numb with additional numbness of the entire body up to the nipples, the whole lasting about six weeks. His "body felt as though it was asleep." During this period he could not bend his knee or ankle. At the time of my examination, eight months later, the deep reflexes were slightly more active on the right. This patient presented a hysterical constitution, with a degenerative, probably syphilitic, neurotic process.

The absence of major hysterical symptoms among the men of this series, blinded at the front, is so striking that it calls for comment. Among those who received their wounds in actual battle there was an absence of stuttering, massive muscular tremors, tics, palsies, aphonias, hysterical deafness, etc.—in short, such phenomena as characterized the cases of major hysteria I saw at Plattsburg. The theory that hysteria does not develop when the wound is a "blighty;" namely, so severe as to put the man definitely out of action, does not seem to afford a satisfactory explanation for the absence of hysteria in these men blinded under shell fire. For in only two or three instances did the soldier seem to realize at the time that his eyes were put out. In most cases the men did not know that they were blinded for weeks, and often for months, after the injury. Some were not told that they had permanently lost their sight, until after they had reached Evergreen. Very few suffered pain of any consequence either when wounded or subsequently; and thus many, their eyes being bandaged, did not suspect the seriousness of their condition. A number spoke of having expected to return to their "outfits" in a few days, and of being disappointed that they were not sent back to them. Nor could I discover from their talk that there had been any desire to escape from the fight, or any feeling of jubilance over being out of it. Their dreams, when such had occurred, were almost invariably of killing Germans, and of themselves coming out victorious. In the case of one patient, a boy only 17, who was somewhat unstable emotionally, a fear element came out in the dreams. He would awaken as "the boche was taking his trench." These findings are not such as we get in certain cases, when the absence of hysteria is attributable to belief in a disabling wound.

It seems reasonable to suppose that in so large a series there must have been men who were potential

candidates for major hysteria. The conditions under which the group received their knock-out wounds were precisely similar to those conditions under which other men were wounded who did develop hysteria. However, there were two factors present in this set of injuries that did not exist in any other: the men were immediately blinded, and consciousness was at once more or less obtunded. The almost universal absence of pain is a tangible evidence of a general blunting of the sensorium. These two distinctive features seem to me of valuable consideration in explaining the absence of hysteria in these cases. Blindness shut out in a flash the horrible scenes of the battle-field. It is interesting to note in this connection that blindness was frequently encountered in soldiers as a hysterical phenomenon. This indicates the frequent importance of vision in connection with the scenes of the battle-field, when a psychic trauma supervenes. The second factor, the obtunding of consciousness, is of greater significance. Obtunding follows of necessity the peculiarly violent head injury sustained in these cases. In the dynamics of hysterical symptomatology formation, there seems often to be a critical moment during which consciousness is in a supreme state of awareness, and hyperemotional tension. This awareness and tension are, in fright situations such as confronted the soldier, most likely concentrated on some imminent hazard to life and overwhelming desire for escape from an unbearable situation. In the hysterical individual, the higher mental faculties seem, at this critical moment—the precipitation instant as it were—to be rendered suddenly inert by emotional panic, and the individual reacts to primitive biologic impulses having self-preservation or escape from an unbearable situation for their goal. In the reflex activities which occur, the higher mental faculties are shunted out of the arcs, and the most varied and distorted associative mechanisms may be set in motion. It is from these mechanisms, coming into action in the lower biologic strata, with the controlling civilizational motives shut out, that the more or less autonomous hysterical symptomatology arises. I think I am safe in saying that because of the instant blunting of consciousness, along with simultaneous blinding, which occurred in these men, it was dynamically impossible for the mechanisms necessary for the acute onset of hysteria to come into play.

It may be remembered that the two men who developed major hysteria had not been wounded in battle or blinded, at the time of the onset of the symptoms. The first man developed symptoms following the explosion of a shell nearby, a month previous to the time his vision failed from acute glaucoma. In the second case, hysterical symptoms followed lumbar puncture some time before the onset of blindness which was due to degenerative processes. There was a third man at Evergreen (Case 120), seen after the foregoing series was compiled, who developed hysterical symptoms; here, also, the symptoms arose independently of battle wounds or blindness. This patient lost his sight following influenza; his hysterical, "shell shock" symptoms ("I hollered and cried") came on in the trenches apparently during the prefebrile period of his influenza.

In the majority of the patients, operation was done within twenty-four hours after injury was received. Usually a general anesthetic was given. Almost without exception those patients who were in an exhausted physical state at the time they received their injury experienced, while recovering from the ether, a condition of delirium in which they imagined themselves fighting in the trenches or carrying on in some violent war activity. In some cases a delirium succeeded the operation.

### ABSENCE OF PAIN

A feature that has occasioned surprise is the fact that these patients almost universally, regardless of the manner in which the eyes were destroyed, give a history of having suffered very little pain. This was true even though both eyeballs were entirely evulsed from their sockets, and perhaps with considerable destruction of the surrounding tissues.

### THE FORTITUDE SHOWN BY BLINDED SOLDIERS

There was surprisingly little depression experienced by the men as a result of the knowledge of being blind. As has already been said, many did not realize, often for weeks or months, that their sight was gone; and, when they at length found out their true condition, they had already made long strides toward adapting themselves to a state of blindness. Those who were much depressed over the loss of their eyes were either those who had sustained unusually severe injuries or showed signs of constitutional instability or had been isolated from other blinded men from the time of their injuries to the time they returned to the United States.

In any consideration of our blinded soldiers, we are confronted with the stern fact that these men are permanently disabled and with the handicap that is generally looked on as well-nigh insurmountable. The question of supreme interest for all of us, then, is to what extent this group of returned soldiers are going to be able to adapt themselves to the social and economic life of their communities. War compensation, which is generously supplied these men by the government, while it takes care of ordinary financial needs, can never of itself, except in a most inferior, vegetative kind of person, give happiness or content or make the man a useful member of society. These fellows were an active, energetic, often ambitious lot. For them to drag out an idle, vegetative existence, subsisting on government bounty, would mean certain deterioration and mental dilapidation. Better than this, for the individual, would be a beggar's post, the street corner; for that at least has, as an incentive, the question of the day's luck. If life is to be bearable to these men, and if they are to be other than a burden to their communities, they must be made again independent, active individuals with initiative, competing with a degree of equality with their fellows, in social and economic affairs. It was for the purpose of thus training the blind that the educational department of Evergreen was established. It is said that a blind man must be "125 per cent.;" that is, he must be 25 per cent. more efficient in a particular calling than the sighted man with whom he has to compete.

### RECREATIONAL AND EDUCATIONAL ACTIVITIES

Shortly after the men arrived at the hospital, as soon as their physical condition warranted it, they were granted a furlough, and immediately on their return to the post, they were introduced, on the psychiatrist's recommendation, into various activities, according to each individual need. At first these were largely recre-

ational in character, such as dancing, swimming, bowling, theaters and concerts. At the same time the man could take on some of the activities of the curative work shop, such as basketry, carpentry, weaving and netting. Wherever possible they were introduced at once to the typewriter and to as much study of braille as the condition of their nerves and attitude would warrant. Along with the foregoing, many of the patients immediately entered on some vocational and educational training: salesmanship, physiotherapy, literature, book binding, machine shop industries, different forms of agriculture, and many other pursuits. Chicken raising was being followed by a number of the men with great enthusiasm.

The response to the many avenues of rehabilitation open to the men was very general; but there were a few to whom the task of readjustment seemed insurmountable. In this group there were three men who were constitutionally inferiors; undisciplined, irresponsible individuals of nomadic habits, who would have been ne'er-do-wells and trouble makers, just as well, if they had not lost their sight. There were also four cyclothymic individuals of the constitutionally elated character. These men, on account of their native excessive activity and "press of occupation," had great difficulty in resigning themselves to the handicap of blindness. With this group there were periodic outbursts of insubordination to authority; they would become paranoid and violently resentful of authority and discipline. During the intervals they usually did good work. There were seven patients in whom hyperthyroidism presented a complicating factor in the matter of rehabilitation. In one the thyroid condition was a serious handicap. A few had always been unresourceful, phlegmatic and at times constitutionally depressed. In these cases it was rarely possible to counteract the inherent tendency to drift into a life of inactivity, with loss of ambition, and general deterioration.

Peripheral nerve injuries were found in twenty-one of the men. In two of these cases the nerve injuries seriously interfered with the use of one hand, but the majority of these lesions were of minor significance, and for the most part caused merely small areas of sensory disturbance, infra-orbitally or supra-orbitally. There was one man in the hospital who had lost one hand, and one man with both hands gone.

The impression prevails that a visitor to the hospital would encounter a depressed and unhappy lot of men. On the contrary, one found a cheery atmosphere of interest, joviality and activity. There was much "joshing" and fun-making. The boys always referred to each other as "blinks," and would speak of getting a "half blink" (a man with one good eye) to take them about. If a cane fell or some one blundered noisily, there was likely to be a chorus of: "Hey, blink, better get your eyes examined." There were stock jokes about being able to see when they got their glass eyes; and about getting jobs as night watchmen. The patients went about the grounds and buildings in groups or alone with almost no hesitancy or groping. It was not always possible to know that a man was blind from his manner or walk. They enjoyed doing certain things, like holding a coat for one to put on, or opening the door if going out or in with any one, etc. These things seemed to make them feel independent and less set apart from sighted men. The blind boys were especially fond of dancing. This was one of the first things they were taught at Evergreen. It not only seemed to instil confidence, in a surprisingly short time, in their ability to get about, but the knowledge that they were not to be shut out from the good times of other young people was a big element in the matter of sane adjustment to life. These dances with their chaperones and hostesses to see that no boy was neglected, the daily tea and cakes at the Red Cross house, the quiet story-reading hours, with the interesting work of the school, opened a new world to many of the lads. The majority had grown up in very simple surroundings. It was interesting to see how quickly some of them threw off uncouthness and took on amenities.

A curious thing in connection with these young men was the fact that the majority of them, sooner or later, discounted entirely the loss of their eyes. Again and again one would hear: "No; I don't miss my eyes. I never think of them except when I go into strange places." Many men dismissed the subject of being crippled by blindness with an air of contempt. In daily contact with these men one got the impression that they had to stop to consider, to remind themselves that they were without eyes, when their blindness was brought to notice. The remaining senses, in some cases, became marvelously acute. There were men, totally blind, who could tell when they approached a building or a tree, possibly through appreciation of some echo or through a change in atmospheric pressure. One morning, one of the patients came into a class room, which ordinarily contained three typewriting tables with a chair at each. For some reason, earlier in the day, the back of the room had been packed with chairs. The man stopped suddenly inside the door to ask: "What's the crowd for?" We told him there was no one in the room but ourselves (myself and a teacher); but the young man was not satisfied. He kept turning his head about, and finally came out with: "There's something in this room; it's full of people, or something else."

### RELIEF AFFORDED BY ASSURANCE OF FUTURE SUPPORT

In considering the reactions of these men it is well to take into account certain factors that undoubtedly played an important rôle. The men realized from the beginning that their future support was assured. Thus was removed the great anxiety that usually goes with the affliction of blindness. One of the great factors that contributed toward sustaining their morale and attitude of cheerfulness has been the fact of being associated with those similarly afflicted in a big common experience. The patients frequently declared that they were far happier when they were with other blinded men. It was noticeable that in a few instances when men had been placed in hospitals or posts, apart from other blinded soldiers, they had been lonely and unhappy, and unable to adjust themselves successfully to their handicap. It happened almost uniformly that the men were eager to return to the life at the hospital after they had been home on furlough. The discipline of military life was, I believe, of inestimable value to the blind men at Evergreen; modified as it was, and wisely applied with rare insight and administrative ability.

In conclusion, I wish to add that I observed no type of mental reaction that may be regarded as peculiar to the blind. The fact that these men were interested

and entertained, and made to realize the many possible personal accomplishments open to them, tided them over that critical period of adaptation and nervous strain which otherwise would probably have thrown many of them into a life of inadequacy and hypochondriacal invalidism. Those patients who developed psychiatric conditions, such as paranoid ideas, represented cases of constitutional psychopathy, or had sustained organic damage to the brain by reason of concussion, penetrating wounds or other cause.

4616 Bayard Street.

# FETAL DEATH

## A STUDY OF ONE HUNDRED AND NINETEEN DEATHS IN A SERIES OF CASES *

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Williams[1] reported, in 1915, his series of 705 fetal deaths occurring in 10,000 consecutive cases at the Johns Hopkins Hospital. His total of 7 per cent. mortality included babies from the seventh month of gestation to fourteen days after delivery. Holt and Babbitt[2] reported in the same year a series of 10,000 cases from the Sloan Maternity Hospital. Their total mortality was 7.2 per cent., of which 4.2 per cent. represented stillbirths, while 3 per cent. occurred in infants who died within fourteen days following delivery; of these, half died during the first day. The mechanism of the various causes of death during labor has been discussed in a paper by Reed.[3]

My purpose, in this paper, is to record another series of carefully observed cases, which should be of added interest since, as far as I can determine, there is only one similar report from any of the Pacific or Middle Western states, that being a report of a series of 500 cases, with twenty-seven deaths, issued from our own clinic by Slemons,[4] in 1915, in a paper discussing placental bacteremia as a cause of fetal death.

The present report covers a series of 2,717 deliveries in the University of California Hospital, the series terminating, Dec. 31, 1918. Patients in 2,215 cases were delivered in the hospital, and in 502, at their homes. Reckoning from the period of possible viability (the thirtieth week) to twelve hours after delivery, there were ninety-seven fetal deaths. So many factors play their part in causing the death of a child after the first twelve hours of life that it has been most difficult to assign correctly the part played by injury at birth. We have, in consequence, restricted our limits as above indicated. Within these limitations, the fetal mortality was 3.6 per cent.

In addition, there were found in this series twenty-two cases of fetal death occurring before the age of viability, namely, during the fifth and the sixth months, bringing the total deaths up to 119, or 4.4 per cent. We have entered these for comparison in several of our tables. As there were two instances of the delivery of twins, there were only 117 mothers who lost their babies.

In Table 1, we have attempted to classify our cases according to the cause of death. For the sake of clearness, we have assigned each case to one definite category, although it is obvious that it could not have been always strictly correct to do so, since several factors may present themselves for consideration, each of which contributes to the final result. For instance, if a case of toxemia of pregnancy calls for interference before the onset of labor, a bag may be introduced, and if the membranes are ruptured in the process and the head fails to engage, prolapse of the cord may occur, with indications for hurried extraction. The child is dead, and the question is, What killed it: toxemia, introduction of the bag, or extraction? It is often difficult to decide. But when a definite cause for premature labor or premature induction of labor is apparent, we have attributed death to this cause rather than to prematurity as such.

### CAUSE OF DEATH

*Syphilis.*—In this group are fifteen cases. All of the mothers had syphilitic treatment during pregnancy. The cases were diagnosed by (1) a strongly positive Wassermann reaction in the mother, or (2) by syphilitic changes in the placenta, or definite syphilitic lesions in the fetus. Microscopic examination was made of each placenta in this entire series. The Wassermann test has been made in all doubtful cases since 1911, and in every case since 1914. It is quite possible that some syphilitic cases have escaped detection, even with these methods of diagnosis. The greater percentage of fetal death from syphilis in Williams' cases is due undoubtedly to the great prevalence of syphilis in the negroes of his clinic: 21.6 per cent of the negroes in his clinic gave manifestations of syphilis, which was present in only 4.8 per cent. of his whites. Our series includes few negroes.

TABLE 1.—CAUSE AND PERIOD OF ONE HUNDRED AND NINETEEN FETAL DEATHS

| Cause | Under 30 Weeks | Over 30 Weeks | Percentage | Williams in 10,000 Cases |
|---|---|---|---|---|
| Syphilis | 0 | 15 | 15.5 | 26.4 |
| Unknown | 5 | 17 | 17.5 | 18.0 |
| Birth trauma | 0 | 36 | 37.1 | 17.6 |
| Toxemia | 4 | 9 | 9.2 | 6.5 |
| Fetal abnormality | 1 | 8 | 8.2 | 3.4 |
| Prematurity | 2 | 5 | 5.3 | 7.1 |
| Placenta praevia | 2 | 2 | 2.0 | 3.1 |
| Various | 8 | 3 | 5.2 | 11.2 |
| Total | 22 | 97 | 100.0 | |

*Unknown Cause.*—There are seventeen cases in this group, and of this number the infants in ten were macerated. Sufficient evidence could not be found to make a definite diagnosis at necropsy, although it is considered that about 80 per cent. of these cases were really syphilitic. Even should we class all the macerated cases as syphilitic, there remain seven cases in which we have not been able to determine the actual cause of death.

*Birth Trauma.*—Included in this group are thirty-six cases, comprising 37.1 per cent. of the total. The different traumas and the number of deaths for which each was responsible appear in Table 2.

Undoubtedly, some of the deaths in this group represent the premium paid for experience, yet the majority were unavoidable. The cases of prolapsed cord

* From the Woman's Clinic of the University of California Hospital, Frank W. Lynch, M.D., director.

1. Williams, J. W.: The Limitations and Possibilities of Prenatal Care, J. A. M. A. **64**: 95 (Jan. 2) 1915.
2. Holt, L. E., and Babbitt, E. C.: Institutional Mortality of the New-Born, J. A. M. A. **64**: 287 (Jan. 16) 1915.
3. Reed, C. B.: Surg., Gynec. & Obst. **26**: 545, 1918.
4. Slemons, J. M.: Placental Bacteremia, J. A. M. A. **65**: 1265 (Oct. 9) 1915.

are of considerable interest. In one instance, the prolapsed cord was not discovered until two pains before delivery; one pulsating cord might have been replaced; interference was not attempted in another case because of a previous complete rectovaginal laceration through which liquid feces constantly poured into the vagina. In other cases, the cords were pulseless when first examined in the hospital.

We have reviewed the breech cases carefully without finding hope for better results than were obtained under the treatment given—except in one case in which the baby was spontaneously delivered at home before the physician arrived. The body had been born nearly twenty minutes, the head remaining undelivered.

Combining the forceps and prolonged labor cases, we find contracted pelves of moderate grade in seven of the sixteen cases. The patient, in this type of case, is either brought into the hospital far advanced in labor or else is given the test of labor, and the case gets beyond the point at which ideal treatment from the standpoint of the child can be given, because of increased risk to the mother. In his group, it is possible that different treatment would have saved four babies. One patient had been given, before admission, 1 c.c. of pituitary extract during the first stage of labor, and 1 c.c. during the second stage; finally, high forceps were applied. No record of pelvic measurements had been taken before admission. One patient

TABLE 2.—DEATHS CAUSED BY DIFFERENT TYPES OF TRAUMA

| Nature of Trauma | No. of Deaths |
|---|---|
| Prolapsed cord | 9 |
| Low and midforceps | 8 |
| High forceps | 5 |
| Prolonged labor | 8 |
| Breech | 5 |
| Version and extraction | 3 |
| Asphyxia — due to delayed delivery after signs of danger were apparent | 3 |

was allowed to continue in labor six days before there was any interference in this distressing state of false labor pains and prolonged first stage. The cervix was finally dilated manually, and the child was delivered by a most difficult forceps operation. Early interference by cesarean section might have saved one other case in this group, in which a generally contracted pelvis of moderate degree greatly delayed delivery. In one case, pituitary extract was given three times before low forceps were applied. In another case, "twilight sleep" was attempted in a woman with a simple flat pelvis. Labor was greatly prolonged and was finally terminated by pubiotomy, the application of high forceps, wide episiotomy and craniotomy. To these there must be added three other cases in which indecision and delay after the appearance of danger signs undoubtedly contributed to cause death. In the light of the records of the remaining cases, the treatment given seems to have been without criticism.

*Toxemia.*—Under this heading we have grouped nine cases, representing 9.2 per cent. of the total mortality in which some toxemia, as eclampsia or a marked disturbance of kidney function, either caused premature labor or gave definite indications for the termination of pregnancy. Since the mother's welfare is the first consideration, we may naturally expect a high percentage of fetal death when the maternal condition demands interference before term in the presence of toxemia. Our clinic has used every effort to reduce mortality in this group by a well organized prenatal service in which the registered patient is seen at the clinic or visited at her home at two-week intervals. Yet there are always patients entering hospitals who have not had prenatal care. Moreover, eclampsia often comes without warning, as has been emphasized by Lynch.[5] At least one patient in the series developed eclampsia, whose blood pressure and urine had been normal a few days before admission. Williams cites similar cases of rapidly developing toxemia.

TABLE 3.—DEATHS OCCURRING IN DIFFERENT TYPES OF FETAL ABNORMALITY

| Abnormality | No. of Deaths |
|---|---|
| Meningocele — double cleft palate | 1 |
| Congenital cystic kidney | 1 |
| Anencephalic monster | 3 |
| 1 mother, aged 40, quartodecipara | |
| 1 mother, aged 23, primipara | |
| 1 mother, aged 16, primipara | |
| Hydrocephalus | 1 |
| Edema of lungs with right hydrothorax | 1 |
| Congenital heart disease | 1 |
| Perforated interventricular septum | |
| Chronic endocarditis with pulmonary stenosis | |
| Total | 8 |

In one case, the mother used alcohol habitually to great excess. She was drunk when she entered and had, moreover, a systolic blood pressure of 185 and a diastolic pressure of 130, with a heavy trace of albumin in the urine. The child was born macerated.

*Fetal Abnormalities.*—This group comprises eight cases, or 8.2 per cent. of the total. The nature of the abnormalities and the number of times of occurrence of each appear in Table 3.

The infants in all of these cases were stillborn, except the hydrocephalic child, which displayed abortive respiratory efforts during the attempt to extract it. The aftercoming head was delayed twelve minutes after the appearance of the umbilicus. It might better have been perforated.

*Prematurity.*—There are only five cases left in this group after our various subtractions from it, noted above, of those instances in which the children were born alive but succumbed within a few hours. In these five cases we could find no other cause for premature death than immaturity. Necropsy disclosed only ate-

TABLE 4.—FETAL DEATHS FROM MISCELLANEOUS CAUSES BEFORE THE AGE OF VIABILITY

| Cause of Death | No. of Deaths |
|---|---|
| Premature separation of normally implanted placenta | 2 |
| Premature separation of membranes | 1 |
| Laparotomy, hysterotomy and removal of fetus from an incarcerated uterus | 1 |
| Suicide of mother — child delivered by postmortem cesarean section — lived 15 minutes | 1 |
| Pyelitis with severe toxic symptoms | 1 |
| Decompensated heart disease of mother | 1 |

lectasis in each case. Otherwise, the infants were normal for their respective periods of development.

*Placenta Praevia.*—In this group, there were only two cases in which hemorrhage from placenta praevia occurred before manifestations of labor. In one case, the membranes and placenta had been ruptured prior to the insertion of a bag. When the bag was removed from the vagina, the pulseless cord was found to have been prolapsed. The placenta was born before the head. The child was full term and stillborn. In the

5. Lynch, F. W.: Surg., Gynec. & Obst. 17: 472 (Oct.) 1913

other case the patient was delivered by podalic version, after dilatation of the cervix by Voorhees' bag. The child was at term and stillborn.

*Various Causes.*—We have grouped in this class causes from which only one or two deaths occurred. As a result of premature separation of a normally implanted placenta, there was one fetal death; of premature rupture of the membranes, two deaths; of abdominal pregnancy, one death, and of cord hemorrhage, one death.

In the first three of these cases, the fetus was dead before the onset of true labor. The membranes rupture prematurely rather frequently, though they rarely cause fetal death. It would appear that they ruptured one month before delivery in one case, the child dying from an ascending infection through the cord.

The case of abdominal pregnancy was definitely diagnosed some weeks before the operation, while the child was still alive. The difficulty of controlling hemorrhage after the removal of the large placenta from the noncontractile pelvic tissues seemed so great, in the presence of an enormous child (10 pounds), that the case was allowed to go over term, with the expectancy of fetal death with consequent involution and cessation of the placental circulation. Two weeks after cessation of motion, the mother presented sharp rises of temperature and pulse, which were interpreted as definite indications for operation. Abdominal section was performed, and the dead fetus and the partially involuted placena were removed without marked bleeding. Drainage was made over the placental site, through the abdominal wall. This method was chosen deliberately after all possible methods had been explained to the patient who, because of many small dependents, could not afford to take the added risk of a section for a living child. The mother made a good recovery.

The child that died of hemorrhage from the cord was delivered from a woman with placenta praevia, by cesarean section. Presumably, the cord was loosely tied, since the baby was found dead two hours after birth, with considerable blood in the cord dressing. The child was premature, at the seventh month. A larger child might have survived the accident.

*Miscellaneous Causes.*—Deaths from miscellaneous causes, in fetuses under the age of viability, are given in Table 4. I have tabulated several other items of interest brought to light during the review of this series of cases. Reed[3] is of the opinion that there are three times as many deaths in primiparas as in multiparas. In this series, they are nearly equally divided.

TABLE 5.—THE RELATION OF THE NUMBER OF PREGNANCIES TO FETAL DEATH

| Pregnancies | No. of Cases | Percentage |
|---|---|---|
| Primipara | 51 | 43.6 |
| Secundipara | 17 | 14.5 |
| Tertipara | 15 | 12.8 |
| Quartipara to quintodecipara | 37 | 31.6 |

TABLE 6.—AGE OF MOTHER IN RELATION TO FETAL DEATH

| Age of Mother | No. of Cases | Percentage |
|---|---|---|
| 15-19 | 18 | 15.4 |
| 20-24 | 22 | 20.5 |
| 25-29 | 23 | 21.4 |
| 30-34 | 21 | 21.4 |
| 35-39 | 13 | 13.7 |
| 40-45 | 7 | 5.8 |

The relation of the age of the mothers to fetal death (Table 6) shows a remarkable lack of variation. The ages are arranged in groups of five years. The smaller percentage of fetal death when the mothers were under 19 years and over 35 years probably does not indicate the lower incidence of death at these ages, but is a result of the smaller number of cases in these groupings of the series.

Normal pelves were found in ninety-eight cases, generally contracted pelves in eight, simple flat pelves in four, and rachitic flat pelves in three; and there was one case each of rachitic transverse contracted, rachitic generally contracted, assimilation, and funnel pelvis.

TABLE 7.—PRESENTATION OF FETUS

| Presentation | No. of Cases | Percentage |
|---|---|---|
| Left occipito-anterior | 39 | 33.3 |
| Breech | 29 | 24.8 |
| Right occipito-anterior | 17 | 14.5 |
| Right occipitoposterior | 11 | 9.4 |
| Occiput anterior | 3 | 2.8 |
| Left occipitoposterior | 2 | 1.8 |
| Right occipitotransverse | 2 | 1.8 |
| Face | 2 | 1.8 |
| Transverse position | 2 | 1.8 |
| Cesarean section (position not given) | 7 | 5.9 |
| No data | 5 | 4.3 |

The presentation and position of the fetus is given in Table 7.

The high percentage of breech presentations will be noticed, 24.8 per cent., as compared to Pinard's finding of 3,301 breech presentations in 100,000 cases more than seven months pregnant. In the greater percentage of our breech cases, birth was premature, and the position as such complicated labor or caused difficulty in the extraction, and was thus responsible for death in only five cases. The majority of the macerated fetuses in our present series presented the breech. The infrequency of left occipito-anterior and right occipito-anterior positions confirms the general idea that they predispose to easier labor and happier results. Nearly all the unusual positions are represented in the series.

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# ETIOLOGIC STUDIES IN TUBERCULOSIS

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The etiology of pulmonary tuberculosis is far from being a closed subject, and this communication is an attempt to supply what seems to some workers missing links in the etiologic chain. The dicta of many authorities have been apparently blindly accepted by their followers. On close scrutiny it is seen that many statements rest on inference rather than on fact. We have attempted in these few experiments on guinea-pigs to accept no statements, and to trace the tubercle bacillus, if possible, directly from the source of infection to the apparently exposed animal. The final test was of course the necropsy of the guinea-pig. In succession we studied the dust of rooms, the telephone receivers, the eating utensils, the infected hands of patients, the saliva, the transmission by kissing, the infection of tooth brushes, and the danger of flies and of coughing in tuberculous infection for guinea-pigs.

### I. THE DUST OF ROOMS

Since Hance found tubercle bacilli in the dust of a room on the floor of which a patient had spat, and failed to find them in other rooms, several attempts have been made to discover tubercle bacilli in the dust at the Trudeau Sanatorium. The dust collected by a vacuum cleaner from a large rug in the living room was negative on injection into a guinea-pig. The same result was obtained with the dust from a room in the infirmary occupied by a patient with numerous tubercle bacilli in the sputum and a cough so explosive that the mouth was rarely covered. Notwithstanding these results, we again investigated the subject and chose only rooms occupied by patients with severe cough and many tubercle bacilli in the sputum. Dust was collected before the daily cleaning by swabbing with sterile swabs the bed, tables, chairs, bed frames, corners of the rooms and walls near the patient. The swabs were washed in sterile broth, the washings treated with normal sodium hydroxid, incubated for one-half hour, then neutralized with normal hydrochloric acid, centrifugalized, and the sediment divided into three portions. Of these portions, one was inoculated into gentian violet mediums, another was stained in a slide for microscopic examination, and the third was inoculated subcutaneously in the inguinal region into guinea-pigs, two for each swab. In all, twenty-four animals were used.

*Results.*—As the gentian violet mediums were all contaminated, chiefly by molds, this method of study was abandoned.

As the slides stained for tubercle bacilli were all negative and not satisfactory, it was decided to pursue the study only by the inoculation of guinea-pigs.

The twenty-four guinea-pigs inoculated, Feb. 9, 1916, were killed forty-one days later and all organs, except a few enlarged bronchial glands and spleens, appeared normal macroscopically. The suspected organs were macerated and inoculated into a second series of guinea-pigs, March 22, 1916, which were killed, April 27, 1916, and were all negative for tuberculosis.

We then investigated the dust of two rooms in Saranac Lake Village, formerly occupied by two patients both long since dead, one a young colored girl, the other an advanced case. Both had numerous tubercle bacilli and violent coughs. The results were also negative. Since that time the sister of the colored girl who nursed her has developed pulmonary tuberculosis.

The mouthpiece of the telephone used in common by the patients at Trudeau was carefully swabbed out. The results of inoculation were also negative.

Thinking that infection by inhalation might prove more efficacious, we constructed a special glass box in which a guinea-pig was placed and kept in a definite position. This box was then attached to a vacuum cleaning apparatus, and dust drawn through it for one half hour. The three guinea-pigs used were not infected (subjected to dust, Aug. 7, 1916; intracutaneous test, Sept. 20, 0.5 c.c. of 1 per cent. old tuberculin, negative; necropsy, Sept. 24, and suspected organs were macerated and inoculated into a second series of guinea-pigs, which at necropsy, Nov. 20, 1916, showed no tuberculosis).

### II. EATING UTENSILS

The plates, cups, glasses (water and milk), forks, spoons and knives of patients who had numerous tubercle bacilli in their sputum (Gaffky VII and IV) were studied immediately after breakfast. Particular attention was paid to those parts of the cups and glasses that come in contact with the lips. For purposes of study, plates and knives, cups and glasses, and spoons and forks were grouped together. Swabs were used and treated as in the first study. With the exception of two glasses (as noted above) and two spoons, one each of the utensils mentioned was studied for each patient.

*Results.*—The spoons, forks, glasses and cups were contaminated with tubercle bacilli, while the knives and plates remained free. In each necropsy a small portion of the spleen and the pus from the glands were used for smears, and acid-fast organisms were demonstrated.

As Price[1] had previously proved, ordinary washing and rinsing in very hot water is sufficient to sterilize these utensils.

### III. CONTAMINATED HANDS

Two patients with abundant sputum loaded with tubercle bacilli were instructed to cough hard and frequently on their hands, which were then washed in a small quantity of sterile water. The entire wash water was then (Sept. 1, 1916) injected into guinea-pigs, two for each patient. At necropsy (Oct. 20, 1916) generalized tuberculosis was found in all four guinea-pigs. This confirmed the work of Baldwin.[2]

An attempt was then made to infect the hands of a second person by hand shaking and a doorknob by rubbing it with the infected hand. After coughing on the hand, the patient immediately shook hands with a person whose hands had been previously cleansed. The hands of the second person were washed as previously described, and the entire wash water injected subcutaneously in the inguinal region into four guinea-pigs (Sept. 1, 1916), all of which remained free from tuberculosis (necropsy, Oct. 20, 1916).

Jan. 26, 1919, this experiment was repeated and two guinea-pigs were injected, in which at necropsy (Feb. 24 and March 6, 1919) no tuberculosis was found. The patient employed to cough had been so impressed with the danger of coughing that his attempts were considered too feeble, and again, March 14, the experiment was repeated and the two guinea-pigs killed, June 3, and found to contain no tuberculosis. In all these experiments cultures of the wash water on gentian violet mediums and slides stained with carbolfuchsin were negative.

A patient with positive sputum was made to cough several times into his hands and rub his hand over a doorknob previously sterilized. The doorknob was washed with sterile physiologic sodium chlorid solution, and this was injected subcutaneously in the inguinal region into two guinea-pigs, Jan. 26, 1916. At necropsy, June 3, the guinea-pigs showed no tuberculosis, and the slides stained by carbolfuchsin and the gentian violet mediums inoculated were all negative.

### IV. THE SALIVA

Before studying the danger of transmission of tubercle bacilli through kissing, it was deemed advisable to study the saliva. The saliva of two patients with numerous tubercle bacilli in the sputum was collected in a sterile container just before coughing and inoculated subcutaneously in the inguinal region into two

1. Price, J. W.: The Possibilities of Infection from Table Utensils at Sanatoria, J. A. M. A. **52**: 558 (Feb. 13) 1909.
2. Baldwin, E. R.: Tr. Am. Climatological A. **14**: 202, 1918; Philadelphia M. J. **2**: 1198, 1898.

guinea-pigs (Sept. 1, 1916). At necropsy, Oct. 20, 1916, both showed extensive tuberculosis.

### V. KISSING

The lips are constantly moist with saliva and frequently contaminated with sputum. To prove transmission of tubercle bacilli to the object kissed, a patient with many tubercle bacilli in the sputum (Gaffky VIII) was instructed to kiss a sterile Petri dish which was washed with sterile physiologic sodium chlorid solution and inoculated, as previously described, into guinea-pigs. The guinea-pigs inoculated with the washings from plates kissed, some immediately after and some ten minutes after coughing, developed generalized tuberculosis, while those inoculated twenty minutes after coughing remained free from tuberculosis.

As infectiousness of the dishes seemed to vary somewhat with the time of coughing, it was deemed advisable to investigate the question of time more closely. A patient with numerous tubercle bacilli in the sputum was requested to kiss sterile Petri dishes at 7, 9 and 11 a. m., 2, 4, 6 and 9:30 p. m. and to return the dish to the laboratory immediately after kissing it. The dishes kissed at 11 a. m., 4, 6 and 9:30 p. m. were negative, the remainder positive. The experiment was repeated with a patient with fewer tubercle bacilli (Gaffky IV to VII) and only at 7 a. m. was the dish found to be positive.

### VI. THE TOOTH BRUSH

The tooth brush of a patient with tubercle bacilli in the sputum was washed, immediately after it had been used by the patient, in 2 c.c. of sterile physiologic sodium chlorid solution, which was injected, Jan. 26, 1919, subcutaneously in the inguinal region into two guinea-pigs. One guinea-pig died in three days, and the other, examined at necropsy, June 3, 1919, showed marked tuberculosis. While slides stained with carbolfuchsin were only questionably positive, gentian violet mediums showed growth on the twenty-first day.

March 28, 1919, the experiment was repeated and was positive by stain, by culture and by inoculation. On this date, the washings made twelve hours after the brush had been used were studied. One guinea-pig died the day after inoculation, and the second showed marked tuberculosis at necropsy, June 3, 1919. Slides stained and gentian violet mediums inoculated were both negative.

### VII. FLIES

Many have definitely proved that flies fed on tuberculous sputum are contaminated with tubercle bacilli and deposit specks that contain tubercle bacilli. To verify this we placed three flies in a large sterile baker and fed them on sputum containing many tubercle bacilli. The flies apparently developed diarrhea and deposited soft white specks, forming large circles, which contained on examination tubercle bacilli. A study of the bodies and wings of the flies by inoculation into guinea-pigs showed that they were generally contaminated with tubercle bacilli, for all the guinea-pigs developed generalized tuberculosis.

Next a study was made of the real practical danger to young guinea-pigs (two-thirds grown) by such flies when they crawled over and contaminated their food.

Five guinea-pigs were placed in a wire-covered cage or box, and twenty to thirty or more flies confined with them. As the flies died off they were replaced by others. A receptacle containing sputum with numerous tubercle bacilli in it was placed high in the cage. The flies fed on the sputum and on the carrots, which they specked. The specks were shown to contain tubercle bacilli by inoculation of guinea-pigs, and the guinea-pigs in the cage ate the specks on the carrots. All the guinea-pigs in the cage failed to react to old tuberculin given subcutaneously, and at necropsy showed no trace of tuberculosis.

This experiment was repeated, November 18, and two sets of guinea-pigs (four each) used. The first set was exposed to food contaminated by flies with tubercle bacilli from sputum (Gaffky IV to IX) and the second set to bovine tubercle bacilli which had been mixed with negative suptum. The flies were changed weekly. The results were all negative.

### VIII. COUGH

Only one experiment was done with cough. Two patients with numerous tubercle bacilli in the sputum, when performing their pulmonary toilet in the morning, were instructed to cough into the faces of guinea-pigs. This was done, Nov. 12, 1916, but the two guinea-pigs showed at necropsy no tuberculosis.

### COMMENT AND SUMMARY

No originality is claimed for many of these experiments. The whole study was an attempt to discover whether infection in guinea-pigs at least followed exposure to what many have by inference referred to as sufficient exposure for infection of man. We do not wish to imply that these few experiments should be looked on as proof positive in a matter so important as this, but we contend that they emphasize the caution that must be used when infection is inferred to follow proof of contamination. The danger of the dust of rooms in a health resort, from telephone receivers, the danger from properly cleansed eating utensils, the danger from infected hands through handshaking or from knobs of doors, the danger of transmisson by infected flies (at least in guinea-pigs) have not yet been conclusively proved, and these experiments tend to belittle it. On the other hand, the danger of transmission of tubercle bacilli by kissing, or the transference of the tubercle bacilli to eating utensils, and thence if not cleansed to a second person, has been borne out. Our hope in publishing these experiments is that others may realize that the etiology of tuberculosis is not a closed book, but one that contains many disconcerting and confused pages that need to be rewritten.

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**Beginning an Attack on Tuberculosis.**—The question of health as related to industrial efficiency is a question of life. It is a paramount question. On this hinges happiness and this is determined by effectiveness. Effectiveness in life is related to health more closely and more absolutely than to any other thing. It should be the positive duty of every one to bring health to its highest state of perfection. The line between dependence and independence is drawn on the ability of the individual to go to work tomorrow. He who cannot work becomes a dependent. Charity organization statistics show that 85 per cent. of dependence is due to ill health and sickness; the other 15 per cent. is divided among desertion, drunkenness and other causes. A large mass of the people are afflicted with tuberculosis. We know how to cure it. But this means separation of the sick from the well. Until this is done the progress of the disease will not be stamped out. This means proper homes in which the people can be kept and in which danger to the community will be lessened. Tuberculosis is curable in the early stages. There are two ways to deal with it: (1) As it casually arises; cases are then often too far advanced; (2) go find it.—H. B. Favill.

# PROTEOSOTHERAPY BY THE INTRAVENOUS METHOD*

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The most active measures used before the war against infectious diseases can be divided into three groups: (1) vaccines; (2) serums, and (3) specific chemical substances. According, then, to the measures employed, we practiced vaccinotherapy, serotherapy or chemotherapy. In the last few years a new form of therapy has been developed which has been called proteosotherapy or proteintherapy, according as one gives a proteose as a protein foreign to the internal medium (blood and lymph) such as the casein of milk. The characteristic feature of this method is the administration of the protein or proteose by a channel which avoids the action of the digestive juices; that is to say, by a parenteral route, subcutaneous, intramuscular or intravenous. Permit me to present to you briefly my experience with proteosotherapy, which I believe I was the first to use.

## FIRST USE IN NONINFECTIOUS DISEASES

I used it first successfully in the treatment of noninfectious diseases. I began its use in 1908 in cases of hemorrhagic diathesis in order to increase the coagulability of the blood, later in paroxysmal hemoglobinuria, in which it inhibits the occurrence of the paroxysms, at least temporarily. During the war I introduced proteosotherapy into the treatment of infectious diseases, making use of intravenous injections of peptone.

## ACUTE INTOXICATION PRODUCED BY THE PROTEOSES

It has long been known to physiologists that, when given intravenously, the proteoses produce a state of acute intoxication, characterized chiefly by the noncoagulability of the blood, a great and rapid fall of blood pressure, and a state of great excitability of certain nerves or ganglions of the autonomic nervous system. This excitability manifests itself in the lungs in a state of spasm of the bronchi leading to acute emphysema and in the digestive tract by vomiting and diarrhea. This state has been called "peptone shock." It is not specific for peptone. One can produce it equally well by the intravenous injecting of a great number of substances, such as microbic toxins, animal or vegetable toxins, organ extracts, etc., whose common characteristics lie in their protein nature and in the fact that they are substances foreign to the normal humoral medium. These are the substances which have been termed antigens.

## EXPERIMENTAL SHOCK

One can easily obtain this shock in dogs by reinjecting into the veins a little defibrinated blood which has been taken from the animal itself. The same experiment performed in man gave the same results. If instead of defibrinated blood the serum freed from corpuscles is used, the result is the same; namely, that the simple coagulation of the plasma transforms it into a violent poison for the same species, if it is rapidly introduced into the vein; in other words, transforms it into an antigen. In place of serum one can use red or white corpuscles provided they are first destroyed by placing them in distilled water to which an esoteric dose of sodium chlorid is added after hemolysis. Such an emulsion of hemolyzed corpuscles acts like peptone if introduced into a vein. If an antigen is given several times, at sufficiently long intervals, to an animal, the animal becomes more and more sensitive and reacts more and more violently. It has been placed in a state of anaphylaxis. The anaphylactic shock is not different from peptone shock; it is only an exaggeration of it.

## THE MECHANISM OF THE SHOCK

It is not possible for me to analyze here the mechanism of this shock. The question is obscure. The opinions of different authors are very divergent. But if the differences of opinion are great as regards the mechanism, the accord is almost perfect as regards the significance of the phenomenon. Almost all regard it as the expression of an effort which the organism makes to fix and to assimilate the antigen introduced into the veins. From the fact that the shock is identical in character no matter what sort of antigen has been injected, whether blood corpuscles, microbes, toxin or peptone, I think that one can draw the conclusion that the organs or tissues which have for their function this assimilation are always the same, contrary to the opinion of Ehrlich.

If this assimilation took place by the normal route of the digestive tract it would go on without any marked effect. Even by a parenteral route the assimilation could be complete and unnoticeable if the dose were not too large and if the passage into the blood stream took place only very slowly, as for example, after a subcutaneous injection. The shock is produced only if the introduction is rapid, which is the case after an intravenous injection when this contains a large enough dose of antigen.

## AVOIDANCE OF SHOCK

When one employs proteosotherapy to cure a patient of an infectious disease one should avoid shock—at least the violent shock which I have just described. But it seems to be an advantage to produce a mild reaction which I have called the "peptone effect" in contrast to "peptone shock." For this reason it is preferable to inject the peptone in a small dose into a vein rather than under the skin or into a muscle. This intravenous injection of an even very small dose of peptone is an intervention, which can only be performed by a physician who is acquainted with its dangers. It is necessary to proceed extremely slowly. The injection must take many minutes and during the entire period of the injection it is necessary to watch the pulse carefully in order to permit the operator to interrupt or slow down the injection in case the pulse becomes too rapid, for this indicates a rapid fall of blood pressure. If one is prudent the procedure usually takes place without accident. One may find a little transitory tachycardia, some very deep breathing or dyspnea, and a transitory headache. All this passes off within a few minutes, but after the lapse of a half hour to two hours after the injection the patient often suffers from a more or less prolonged rigor, which is followed by a state of defervescence with profuse sweating. The fall of temperature may last until the next day. This is accompanied by a subjective sensation of amelioration and by a diminution in the objective signs of the infection. I repeat the

* Read in the General Medical Meeting at the Seventieth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1919.

injections only every other day. In a great number of cases the improvement is shown after one or two injections, but it is necessary to continue these until a complete cure has been established, in order to avoid a recrudescence.

This treatment was applied by me with good results, at first in typhoid fever, then in numerous cases of septicemia due to streptococcus and staphylococcus. In a large number of cases one finds a rapid disappearance of the germs from the circulating blood. I have also obtained good results in severe erysipelas, in acute polyarticular rheumatism, and in nonrheumatismal arthritis when taken at the start. It appears, then, to be well established that the judicious intravenous administration of peptone can exercise a favorable action in certain infectious conditions and especially in the septicemias.

### ASSUMED MODE OF ACTION

One can assume that the mode of action is the following: Peptone is an easily assimilable antigen. The pathogenic microbes, on the other hand, antigens, are difficult of assimilation. A single mechanism brings about the assimilation of both when they are given by a parenteral route. It is probable that the administration of peptone has the power of stimulating this mechanism and of thus augmenting the destruction of the microbes. As the proteosotherapy is essentially a nonspecific method, it can with advantage be given in association with more or less specific chemical substances when the latter alone are insufficient for bringing about the cure. For this reason I have used proteosotherapy in conjunction with hexamethylenamin in the treatment of typhoid fever, and with sodium salicylate in daily doses of 6 gm. in the treatment of septicemia caused by streptococci and staphylococci and in acute arthritides.

### COMPARISON OF VACCINOTHERAPY AND PROTEOSOTHERAPY

The vaccinotherapy differs from the proteosotherapy in that it is specific. It attempts to provoke the formation of a specific antibody by the administration of a vaccinal antigen. It thus differs from proteosotherapy in its much greater accuracy. However, it would be an error to regard these two methods as being diametric opposites. One must not forget that the vaccine is an antigen like the peptone, and that in the reaction which it provides in the organism there exists a nonspecific element which is common to all antigens. The proof of this lies in the fact that different diseases, notably typhoid fever, can be cured by the administration of cultures of microbes different from the specific germ, such as *Bacillus coli-cummunis, Bacillus proteus,* etc. One advantage of proteosotherapy is that it permits of the experimental study of the nonspecific element of vaccinotherapy and, as the result of this, of a better understanding of the latter; and of better measures for its application. By way of illustration I will cite the following fact: Having determined that the proteosotherapy is much more effective when given by the vein instead of subcutaneously I concluded that this would also be true with vaccinotherapy. Starting from this fact, I have constantly administered vaccines by the vein, beginning with very small doses. My experience embraces numerous cases of septicemia due to the streptococcus, the staphylococcus, the pneumococcus and the meningococcus; certain urinary infection due to *Bacillus coli,* and the staphylococcus, and finally the bacillary dysentery. In all these cases vaccinotherapy by the intravenous route gave results more certain and more rapid than those obtained by the subcutaneous route and permitted one to attain the desired results with doses of vaccine about a thousand times smaller than those which are necessary when given under the skin.

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## DERANGED SEBACEOUS SECRETION AS AN ETIOLOGIC FACTOR IN DISEASES OF THE SKIN*

H. R. VARNEY, M.D.
DETROIT

### CLINICAL OBSERVATIONS

It is the duty of every one to keep physically well and to convey the appearance of physical well-being through a healthy skin. Others must observe us, and in all walks of life, among all classes of society, the healthy-looking person is the one most graciously received. The complex condition resulting in a healthy appearance of the skin is most difficult of adequate definition, yet every one has a rather clear objective knowledge of a perfect skin.

It is my intention to discuss in a most elementary manner a deviation of a well understood function of the skin which is an important etiologic factor in the case of many recognized skin conditions.

### SEBACEOUS GLAND SECRETION

The daily physiologic sebaceous gland secretion amounts to about 1 or 2 gm.; it is quite constant in amount, somewhat less in children and much less in the cold season. The normal sebaceous secretion consists of a liquid and a solid part: the horny-changed membranes of the gland cells after the fat has left them.[1] Analyses have shown the presence of fats (olein, palmitin and stearin), and fatty acids (oleic, palmitic and stearic), inorganic salts, cholesterol, epithelial débris, and water. The cholesterol is thought to be a product of cellular degeneration, and its chemistry is that of the secondary alcohols.[2] It is most plentiful in the skins of ichthyosis and psoriasis, and in comedones.[3] The large polyhedral cells deeper in the glands have been found to contain many fat droplets, and through this cell degeneration, the sebaceous secretion is greatly assisted in its function, which explains why 2 gm. of sebaceous secretion can cover so extensive an area and afford protection.

Endeavoring to discover the true function of the sebaceous secretion, Dr. Max Joseph excised the coccygeal glands of several geese. They survived the operation and were apparently normal, but after entering the water and wetting their feathers, it was noted that the feathers held more water and took longer to dry than those of normal geese.

As is well known, diet greatly influences the sebaceous secretion. Montgomery says:

> Modern man frequently suffers a penury of oxygen; because of this, he tends to select the easily split, easily fermentable

* Read before the Section on Dermatology at the Seventieth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1919.

1. Philippson: Monatsh. f. prakt. Dermat. **11**: 292-309, 1890.
2. Small, J. C.: J. Lab. & Clin. M. **1**: 809 (Aug. 16) 1916.
3. Linser, P.: Deutsch. Arch. f. klin. Med. **80**, Nos. 3-4, 1904.

carbohydrates and the easily absorbable fats, and these are the very foods that favor seborrhea.[4]

Kuznitzky says:

The sebaceous matter in increasing amounts, as we find it in seborrhea oleosa, is not, as was formerly assumed, the cause of the accompanying acne, but, on the contrary, in all likelihood, we have an ever easily recognized weakening of the defense against the organism.[5]

In every recognized skin disease there is always some derangement of the sebaceous function.

### EFFECTS OF INSUFFICIENT OIL

The lack of oil is a far more common deviation than the excess. At the adolescent age, when all glandular activities are greatly increased, the activity of the sebaceous function predisposes to a few dermatoses, such as the seborrheas and some forms of acne. This stage of hypersecretion of oil is of short duration, is most amenable to treatment, and is not nearly so troublesome nor so common an etiologic factor as the insufficient amount of oil. It is this phase of the abnormality that I wish to discuss.

The skin that lacks oil is the skin that is sallow and nontransparent. It makes its possessor appear older than is really the case and does not present an appearance of a state of physiologic well-being. Oil intensifies colors and conveys the healthy look to the skin, and, as well, absorbs soil and prevents its entrance into the skin.

How much better would be the careful training of the daughter in her teens in order that she might convey a healthy, normal color to her cheek, than to see her apply artificial color in a vain attempt to produce a healthy appearing skin!

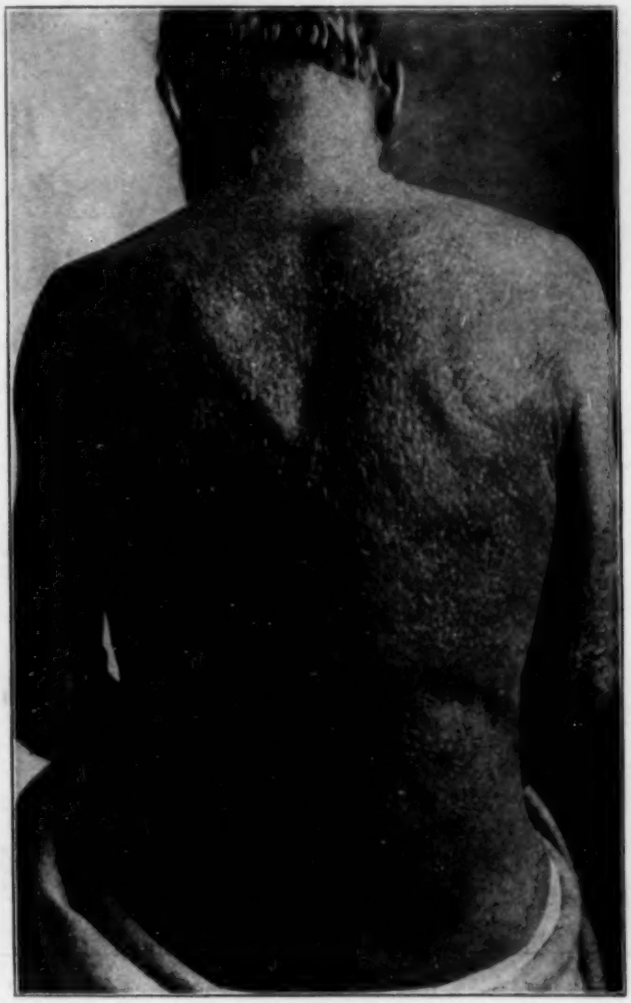

Fig. 1.—Condition resulting from a deranged sebaceous gland secretion, showing the roughened epithelial layers of the skin.

In the normal outer covering of the body, protected from all external irritants by proper cleanliness and sufficient sebaceous material, are embodied the essentials for a comfortable state of the skin. It is thus able to ward off many skin diseases.

No organ of the human body is more generally and constantly mistreated than are the skin and its appendages, and it is this daily improper care that is responsible for a large percentage of skin diseases.

Many of the adult white inhabitants of the north temperate zone, during the cold months of the year, fail to produce sufficient oil properly to protect the skin and to keep it in a healthy condition. There is another large class of persons who have a sufficient allowance of oil, but who are daily removing this protection by too frequent bathing with soap and water, and having no thought for its replacement. American travelers demand hotel rooms with bath, and the excessive bathing in the cold months of the year is not at all necessary to the proper care of the skin. Yet less frequent bathing with soap stimulates oil production, through the dissolving action of the soap on the oil plug long after the soap has been washed away. This is demonstrated clinically following a shampoo, when the scalp and hair shaft become oilier forty-eight hours afterward than they were before. In the Middle West, where lake water constitutes the water supply of the large cities, the water is made more irritating to the skin by the chemical agents used for disinfecting purposes, such as chlorin and lime.

Of the number of individuals who come to the dermatologist with skin affections, the majority definitely show a lack of oil, due, in most cases, to improper toilet, or to a temporary derangement from recent local or constitutional diseases.

How readily one forgets the function of oil in the human skin! When sufficient oil is present, the skin is flexible, whereas a penury of oil gives us a harsh, dry skin, the epithelium of which cracks, exposing sensory nerve endings, with resultant itching and burning. Through these fissures infection may enter, and a weeping, deplorable dermatitis may result. The pyogenic infections and their resulting dermatoses are the most frequent. The bath pruritis of the legs, which develops during the first cold, windy days of fall in the frequent bathers, is the most common illustration.

A general lack of oil produces a constant wasting of bodily heat, resulting in the patient's feeling every sudden change of temperature, which the normal oil prevents. He requires more clothing, as well as bedding, sleeps in a curled or flexed position to keep warm, and thus does not receive the refreshment that should come from a relaxed, straight repose. We are familiar with the fact that without oil it would not be possible for the Eskimo to live in his country, where clothing, even the warmest of furs, would not keep him from freezing if he did not preserve or retain his

4. Montgomery, P. W.: J. Cutan. Dis. **34**: 829 (Dec. 16) 1916.
5. Kuznitzky: Arch. f. Dermat. u. Syph. Orig. **114**: 691-708, 1913.

body heat by applying nature's first covering for warmth, that of oil. To demonstrate further the retention of surface body heat, apply a bland oil and retire with the same coverings as usual. Within a very short time one will note an uncomfortable rapid heating of the body. This also illustrates that if an oil medication is to be applied to a large surface of the skin, it should be applied some time before the patient retires, for the retention of body heat from the oil base, and the discomfort following will often not only derange the comfort of the patient, but interfere with the effect of an appropriate medication. The accompanying temperature charts of a patient with dermatitis exfoliativa illustrate most interestingly the continuous subnormal temperature from loss of body heat, which in turn was caused by loss of oil. The temperature could be brought up to normal for about two hours following a hot bath and saturation with oil.

Fig. 2.—Cracked skin and rough, badly developed finger-nails consequent on a deranged sebaceous gland secretion.

More food is required to keep up bodily heat because of surface waste, since the power of heat retention afforded by oil is lacking. This patient cannot wear wool or coarse fabrics, because of the uncomfortable condition resulting from the roughened, warped epithelial layers of the skin, for the filaments of the wool are constantly pulling on this outer layer of roughened cells.

The man who lacks oil is unable to shave comfortably, and he is led to believe that he has a tender skin and a very wiry beard. True, his skin is hard and rough, and he often cuts himself because of its lack of elasticity and smoothness, and his hair is wiry and hard to cut through lack of oil.

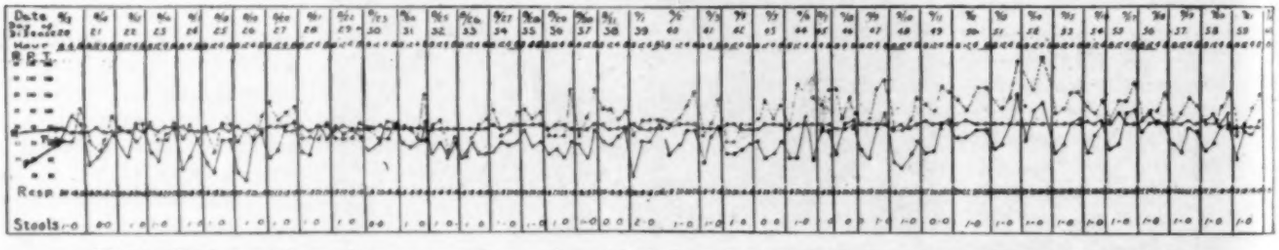

Fig. 3.—Persistent subnormal temperature from a loss of body heat, due to lack of oil, in a case of dermatitis exfoliativa.

The average man cares more for the leather in his shoes than the skin on his face. For when the leather of his shoe becomes dry and hard, he knows the life of the leather will be shortened by cracking, and he at once seeks what the leather most needs, oil; yet seldom or never replaces the oil in his own skin, even though it is most evident that it is needed. He is fond of alcoholic applications after shaving, which remove the little oil that remains, rather than of putting back into his skin the oil that he has taken out with soap and water. When he puts this oil back, his hair shaft will cut much more easily, and his skin will not so readily be cut in shaving, for the wiry beard is the hair that is not only devoid of most of its normal oil, but also hardened by water and alcoholic lotions. How promptly, if we practice replacing the oil after shaving, will we note the greater ease with which the hairs can be cut, the resultant longevity of the razor's edge and the greater comfort! And we may perhaps escape becoming a slave to the barber.

The dry skin that is constantly cracking admits any and all forms of infection that the human skin is capable of harboring, from the pyogenic organism to *Spirochaeta pallida*.

The normal amount of oil of the skin has many functions, some of which are well interpreted, others that are very indefinitely understood, or knowledge of them poorly applied, and still others, I believe, that are unrecognized.

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## ABSTRACT OF DISCUSSION

Dr. Richard L. Sutton, Kansas City, Mo.: I think Dr. Varney has covered rather a broad subject in a very good manner. Many of us do not appreciate and realize the discomfort which a dry, harsh skin may cause. During the past two or three years I have frequently prescribed for the relief of this condition a combination first suggested by a dermatologist of Chicago. It consists of powdered tragacanth, 4 gm.; phenol, glycerin and oil of bergamot, of each, 5 minims; olive oil, 120 c.c, and distilled water, sufficient to make 480 c.c. Persons whose skins are dry and hard can use this mixture with excellent results. For a long time we prescribed it under the designation of "Pusey's mixture"; but the resultant amount of advertising was too great for a competitor so close a hand, and in my office we now invariably refer to it as "the dew of Sahara."

Dr. Harold N. Cole, Cleveland: I want to bear witness to the value of this remedy. I have used it most successfully in many cases of pruritus.

Dr. John E. Lane, New Haven, Conn.: I am rather surprised at Dr. Varney's experience that washing the scalp increases the amount of oil secreted and that this is noticeable as early as forty-eight hours after the shampoo. My experience has been exactly the opposite and while I use other agents for combating seborrhea of the scalp, I have found frequent shampoos about the best single treatment for this condition. The dry skin of the face caused by too vigorous use of soap is a common condition in men, but I see it much less frequently in women. This is probably due to the fact that the latter use more cold cream and frequently use it as a substitute for soap and water.

Dr. G. A. Hare, Fresno, Calif.: The temperature is increased or diminished by the use of oil, if I understood correctly. To put the question another way, does not oil

increase the retention of heat? I wish Dr. Varney would tell us of any observation he may have made on that. Also whether a dry skin, which is so annoying, is due to a retention of heat or to interference with the nerve mechanism. I wonder whether he has any evidence to guide us in the use of the shampoo in these cases, as to whether the soap and water have anything to do with the production of oil or whether the active massage is the factor of most importance.

DR. C. A. SIMPSON, Washington, D. C.: I should like to ask Dr. Varney if senile atrophy of the skin does not play a large part in hypo-activity of the sebaceous glands. Most of my patients, excluding those with xerodermatous lesions, who suffer from dry skin are over 35 years of age. They have a thin, atrophic skin, prominently visible blood vessels, and other signs of cutaneous atrophy, such atrophy being more conspicuous on the extensor than on the flexor surfaces. I agree with all that Dr. Varney says, but I believe that senile atrophy of the skin (not necessarily in a senile person) is very often the primary lesion. The lessened activity of the sebaceous glands and their final atrophy simply share in the general and primary cutaneous atrophic process seen in some patients at a relatively early age.

DR. HENRY R. VARNEY, Detroit: In classifying oil deviations, I have arranged them in two general classes—the excess and the insufficient. The excess is manifested at the age of hyperactivity of all glandular functions. The excessively oily skin is caused by the constant attempt of the patient to remove the oil by frequent use of soap, thereby stimulating and liquefying the oil plug.

The less frequent use of soap will clearly demonstrate this fact through prompt reduction of the amount of oil. We must entertain the varying effect which water has on the skin owing to the great difference in its softness in different sections. The water supply of the lake sections of the United States is treated chemically for disinfecting purposes, and these chemicals have a decidedly drying and roughening effect on the skin because of their direct action on the normal oil of the skin. The people who are taught to bathe daily and use soap freely can carry on such a toilet without discomfort during the summer months, but during the winter months many adults have insufficient oil and through frequent bathing render the skin rough and dry and more susceptible to itching dermatoses. I do not think that I can answer Dr. Hare's questions, but it is a fact that oil does assist in retaining and equalizing body heat. The senile atrophies are a different condition from the congenital ichthyoses. We have to rely on oil, not only for protection and cleansing purposes, but for comfort, and patients with beginning senile atrophies, with the pigmented patches and the roughening, which appears later, of the epithelial layer with ulcers, etc., could be given much comfort and protection from all outward irritation and perhaps carcinoma later by a proper amount of protective oil.

# AN OPERATION FOR "CLAW FOOT"*

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The term "claw foot" is generally accepted to mean a foot with exaggerated arch, prominent metatarsals and hammer toe, with corns on the toes, and callosites on the sole of the foot over the distal end of the metatarsals.

The cause of this deformity may be either a limit to dorsal flexion, or an impairment of the intrinsic muscles of the foot from paralysis, or both.

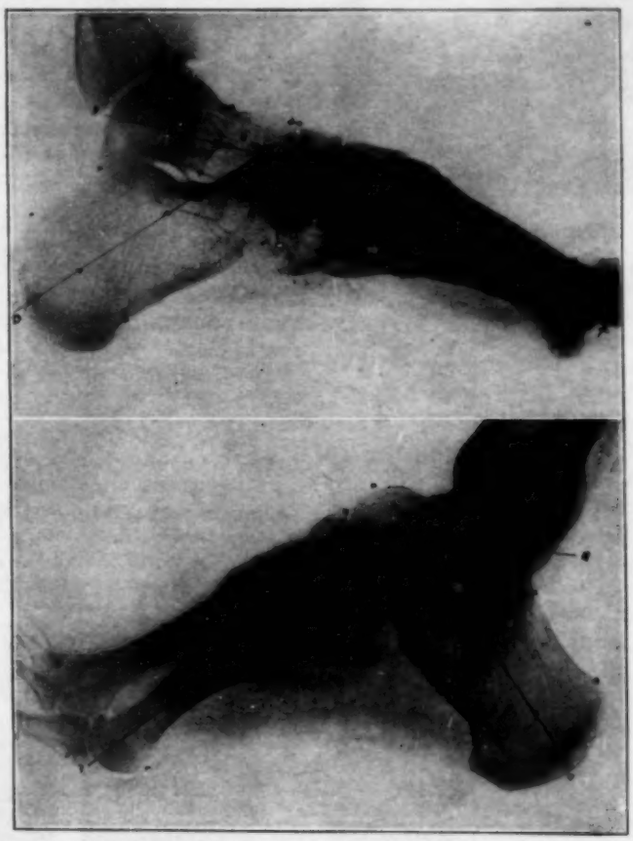

Fig. 1.—Comparison of normal foot (above) with claw foot (below), showing exaggerated arch of the claw foot and elevated toes: *A-B*, axis of astragalus; *C-D*, axis of os calcis; *E-F*, axis of navicular, internal cuneiform and first metatarsal. Compare angle made by *D-C* and *E-F* in upper figure with the angle made by *A-B* and *C-D* in the lower. The comparison shows that the deformity is caused by the dropping down of the front foot at the mediotarsal joint.

In cases in which there is only a limit of dorsal flexion—"muscle bound feet"—especially in children, a marked change in the position of the tarsals, metatarsals and toes may be prevented from developing by a restoration of freedom in dorsal flexion. In cases in which a gross change has taken place in the position of the tarsals and metatarsals, with shortening of the plantar structures, exaggerated arch and hammer toe, a much more complicated problem is encountered. The shortening of the plantar structures accentuates the effect of the common extensors in deforming the toes, and the hyperextension of the toes accentuates the shortening of the plantar structures.

A study of many roentgenograms of such feet shows that this deformity takes place chiefly at the articulation between the astragalus and the scaphoid. The relation between the cuneiform and cuboid and the metatarsals is very slightly changed, if at all. In these cases there may appear to be, on account of the exaggerated arch, a displacement downward of the os calcis, but such is not the case. The upper half of Figure 1 is a roentgenogram of an approximately normal foot; the lower half of Figure 1, one of a markedly developed claw foot—it shows at what point the deformity takes place.

In these cases, therefore, there are two problems to be solved: first, the correction of the exaggerated arch, and second, the removal of the deforming power, on the toes, of the common extensors, at the same time making more direct and effective their function as

* From the service of the New York Orthopedic Hospital.
* Read before the Section on Orthopedic Surgery at the Seventieth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1919.

dorsal flexors of the foot, which has been lost because of the deformity of the toes. Elongating the plantar structures, by separating them from their attachments to the os calcis, makes possible the correction of the exaggerated arch by elevating the foot anterior to the astragalus.

The second problem cannot be successfully met without destroying completely the power of the common

Fig. 2.—Lines of incision.

extensors to extend the toes and transferring their attachment to a point in the foot which will insure the most powerful and direct exercise of their force in elevating the front foot at the mediotarsal articulation and in dorsal flexion at the ankle joint. This may be done by the division of the common extensors and the insertion of their proximal ends into the external cuneiform bone. This point of attachment is selected because it will insure the exertion of their force in elevating the front foot, and in serving as direct and positive dorsal flexors of the foot at the ankle joint. In most of these cases, there is some degree of inversion of the foot, and the attachment of the common extensors at this point such as that described insures correction of the inversion. In those cases in which there is also any serious degree of limitation of dorsal flexion at the ankle joint, subsequent lengthening of the Achilles tendon may be necessary.

After the usual preparation of the foot, an incision 1½ inches long is made internally through the skin and subcutaneous tissue over the os calcis, and with a periosteal elevator the plantar structures are separated from their attachment to the bone. The suggestion for this feature of the technic is from an article by Steindler.[1] With the exercise of force the front foot is elevated, the exaggerated arch corrected, and the position of the metatarsals improved. Second, through a curved incision, 3 or 4 inches long, on the dorsum of the foot to the outer side of the median line, the common extensor tendons and the internal cuneiform bone are exposed (Fig. 2). The tendons are divided low down, and their proximal ends pulled through a tunnel in the external cuneiform bone, and held there by a suture of forty-day chromic catgut. Subcutaneous tissue is closed by plain catgut, and the skin with ten-day chromic gut.

1. Steindler, Arthur: Operative Treatment of Pes Cavus, Surg., Gynec. & Obst. 24:612 (May) 1917.

The foot is then put in plaster, with the metatarsals in corrected position and the toes straight, with a thick felt pad under the sole. The plaster is worn for five weeks, when it is removed daily for exercises and massage. After seven weeks, the patient is permitted to walk without plaster, though massage and exercises are continued for six weeks longer.

The importance of not lengthening the Achilles tendon at this time is obvious; its resistance is a great aid in correcting the cavus. As has been indicated above, the Achilles tendon may be lengthened, if it seems necessary, after six months.

Our first operation for clawfoot was performed, April 24, 1917, and since then nineteen others have been performed: in fifteen cases, on one foot, and in five cases, on both feet. Operations, therefore, were performed on twenty-five feet, all at the New York Orthopaedic Hospital.

A sufficient length of time has elapsed in all of the cases referred to here, and especially in the earlier ones, to permit a fair estimate of the result. In every instance there has been shown a definite amount of improvement, and the effect of the common extensors' acting from their new point of attachment has been conspicuously shown to enhance their power in elevating the front foot, and their power as dorsal flexors at the ankle joint.

Figures 3 and 4 are photographs taken before and after operation in the case of a boy, aged 12, with a single claw foot, and are fairly representative.

It seems unnecessary to publish in detail a report of each case, as there have been no complications, and no failure of the tendons to hold in any case; nor has there been any reappearance of the deformity of the toes, nor any impairment of their control, as their control is sufficiently maintained by the short extensors.

## ABSTRACT OF DISCUSSION

Dr. Benjamin P. Farrell, New York: I agree with Dr. Hibbs. The results from this operation are very satisfactory, and it was a surprise to me to find where the deformity took place. It was my opinion that the deformity was between the tarsal and metatarsal joints. The procedure gives very satisfactory results.

Fig. 3.—Claw foot of a boy, aged 12, before operation.

Fig. 4.—Same foot as in Figure 3, after operation.

Dr. Fred S. Williams, Bridgeport, Conn.: I wish to report two cases in which I followed the technic of Dr. Hibbs. One patient was a man, 23 years of age; and the other was a girl, 16 years of age. The results in both cases were as satisfactory as those described by Dr. Hibbs. If the Achilles tendon is lengthened, this condition should be corrected. In many cases, the tendon is not short, but merely has that appearance. This should not be overlooked.

Dr. John Prentiss Lord, Omaha: I have been undertaking to cure these feet by separating the tendons from the toes, and preserving just as much of the length as possible,

boring holes through the heads of the metatarsals and putting the tendons through the holes, making a half hitch of the tendon, and usually suturing it. The results of the operation have been very gratifying; although it must be considered that in some persons, particularly in adults, the deformity is so extreme that a perfect foot cannot be hoped for. I have been undertaking, however, in some cases, to improve this badly shaped foot by doing a cuneiform osteotomy through the navicular region and removing as much bone as may be necessary in order to reshape the foot. That procedure has proved most effective in relieving the deformity and meeting, as far as may be, the other mechanical and functional conditions. It may be said in criticism of doing so radical a procedure as cuneiform osteotomy in adults, that the subjects are subsequently disabled for a considerable length of time, from three to four months or more.

Dr. John Ridlon, Chicago: I have done the operation advised by Dr. Lord, which, I understand, is the procedure devised by Dr. Sherman of San Francisco, in many cases, and have never found it of much use. I have been accustomed for many years to lengthen the dorsal tendons of the toes by tenotomy at the first operation, holding that lengthening by putting the foot in plaster of Paris for long periods, and then doing a second operation, the cuneiform operation advised by Dr. Hibbs. I think that is the only operation that will give a permanent result in these bad feet. In feet that are not very bad, many things can be done that will be satisfactory; but in bad cases in adults, the only thing is to destroy the deformity in the way mentioned by Dr. Hibbs.

Dr. Edwin W. Ryerson, Chicago: This work is, of course, a modification of the work originally done by Sherman of San Francisco, and published a number of years ago, in which the extensor tendons were fastened to the distal ends of the metatarsal bones. It is efficacious, if done well. The only way to do it successfully is to loosen the plantar structures at first. It is also well to destroy the astragalonavicular joint. Make an arthrodesis there. These cases are very numerous. It has been a constant surprise to me to find how many women and men have a hollow clawfoot. There is also apt to be an inward deviation, as Dr. Hibbs states. The one mistake is to think that there is a shortening of the Achilles tendon. As the pictures show, the posterior part of the os calcis is more apt to be dropped than raised. It was a pleasure to me to see the demonstration of the deformity that I had always considered to be a dropping of the metatarsal bones, but Dr. Hibbs has shown that it is at the astragalonavicular junction that the deformity occurs. The detail of whether we use silk or something else is unimportant. We must force the toes down into complete plantar flexion. If we do not, we shall be chagrined to see how dorsiflexed they will become after a while, and how rigidly they will persist in that position.

Dr. James W. Sever, Boston: I think that it would be interesting if Dr. Hibbs, in closing the discussion, would give us some idea of the etiology of the cases. I believe that they represent what we have known as the nondeforming Shaffer clubfoot. At the Children's Hospital, in Boston, we have been operating on a number of these patients, but by no means doing as well as Dr. Hibbs has done. We have been using the extensor longus hallucis, transplanting it into the head of the first metatarsal. In view of what Dr. Ryerson has said, if you do an arthrodesis at the astragalonavicular junction, provided you get a loosening of the plantar fascia, I do not see the use in transplanting the tendons.

Dr. Samuel W. Boorstein, New York: We must remember that many cases of clawfoot are really due to spastic paralysis. It seems to me, therefore, that Dr. Ryerson's suggestion of destroying the joint at the astragalonavicular articulation is practical. If this is not done, the spasm of some muscles may cause a recurrence of the deformity. It is well to relieve the spasm of the muscles by the transplanting advocated by Dr. Hibbs and also destroy the joint, combining the two procedures.

Dr. Russell A. Hibbs, New York: In reply to Dr. Sever's question, as to the cause of this condition, there are two classes of cases: one, in which there is simply a limitation of dorsal flexion in early life. The other class consists of cases with paralysis, perhaps poliomyelitis, probably undetected, as many cases have been; or perhaps the spastic form of paralysis. The whole point of my paper, if it had one, was that in the first class of cases the removal of the limit to dorsal flexion may prevent the development of the deformity and that in the second the performance of this operation earlier will prevent the necessity of an arthrodesis. I have operated on ten or twelve adult feet, and in all there has been a distinct improvement. I am not prepared to say whether I should have done an arthrodesis also or not; but if we can avoid doing that, at that articulation, it is most important to do so; for this articulation is important in maintaining the flexibility of the foot.

Dr. John L. Porter, Chicago: I have been waiting to hear Dr. Hibbs tell us the advantage that his operation has over Sherman's operation which we have been doing, and he has failed to do that in his response.

Dr. Hibbs: In my paper I said that that bone was selected for two reasons. One was that by attaching these tendons to the external cuneiform bone, you get a direct pull from these tendons at a concentrated point, as elevator of the front-foot. In the second place the inversion is corrected.

Dr. Ellis W. Jones, Los Angeles: We have studied a number of these cases and find that about 30 per cent. have an occult spina bifida. The remaining 70 per cent. of the cases of claw foot are due to infantile paralysis or spastic paralysis; but I think this etiology of spina bifida has a very definite place in claw foot.

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# A CONSIDERATION OF SOME OF THE PROBLEMS PRESENTED BY AMPUTATIONS *

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Apart altogether from the psychologic factors pertaining to amputation cases, the desire of some to stay indefinitely in comfortable quarters, the effort of some to get all that is "coming to them," the anxiety of others to secure a "square deal," the personality of the individual, and other similar difficulties that will not be considered in this paper, the chief problems relate themselves to (1) the stump and (2) the artificial appliance to be used as a substitute for the member lost.

Up to the present time we have had slightly more than 3,000 amputations to deal with in the Canadian army medical corps.

The policy of the government has been to treat all amputation cases in a central depot, and to supply them with artificial limbs from a government controlled and operated factory in the same center, with subsidiary plants, to take care of alterations and repairs, in strategic points in various military districts of the dominion. The central treatment depot is at the Dominion Orthopedic Hospital, Toronto, and the limb factory is adjacent.

I am related to these two institutions as consultant and adviser, and therefore have had an opportunity seldom given to one person to study these cases, and to become acquainted with the problems presenting themselves.

## AN IDEAL STUMP

An ideal stump might be defined as one the length of which will best permit the instrument maker to fit

* Read before the Section on Orthopedic Surgery at the Seventieth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1919.

the most suitable appliances for the portion of the limb amputated. It should have a linear scar free from puckering or infolding of the skin, with sufficient flap to cover readily the end of the bone, but without redundancy. It should have a pad of fat and subcutaneous tissue over the bone end, and should not be adherent. The joints above the amputation should have a full range of motion.

While this ideal may be kept before one at all times, it is seldom realized, and the ingenuity of the surgeon, and the mechanical skill of the artificial limb maker are therefore constantly taxed to make the most of the possibilities as they are presented.

In the early stages of the war the tremendous problem of infection, and the difficulty of dealing with it adequately, gave us a great many so-called guillotine amputations. These practically always made impossible stumps to which to fit artificial limbs, even if healing became complete; and a secondary amputation became necessary.

In the later stages, with a better knowledge of dealing with infection, and the methods of primary or delayed primary suture, much better stumps resulted.

At the present stage, the amputation cases seen are for the most part healed, but there are still some surgical conditions remaining, such as septic conditions, ulcerations and sinuses, as well as certain deformities and edemas, which must be cleared up before the artificial appliances may be usefully applied. Our problems at present, therefore, fall into several groups.

### SURGICAL PROBLEMS

1. It is thoroughly established that all tissues harbor latent infection, which may be lighted up very easily. In some instances, massage and manipulation of the stump may be sufficient to start afresh a cellulitis which may become very troublesome. A traumatism, such as a fall or a bruise, may be the occasion of similar infection. This condition is usually cleared up by antiseptic baths or compresses and rest, and in some cases incision is required to drain local collections of pus.

2. Ulcers still remain in some cases after old, so-called guillotine operations, or may result from breaking down of scar. These ulcers and the scar tissue should be excised and a linear scar substituted. This is often possible without sacrificing any length of bone, if adhesive strips are attached to the skin above the ulcerated area, and extension made by means of weight and pulley, or by means of the modified Thomas knee splint. It is never good practice to attempt skin grafting in these ulcerated areas, as they almost invariably break down under the stress of the use of an artificial limb. If the scar or ulcer cannot be excised, and a good covering of the bone end accomplished without shortening of the bone, a reamputation becomes necessary.

3. A sinus or series of sinuses may combine, and are sometimes very difficult to get permanently healed. In my experience these sinuses persist as a result of either a foreign body at the bottom, or owing to the fact that they have developed a rigid, noncollapsible wall of fibrous tissue, and on removal of the cause they will invariably heal promptly. The foreign body is most frequently a silk ligature, a bit of clothing, a shrapnel fragment, or a sequestrum. The careful removal of these, and cleaning out of the unhealthy granulation tissue of the sinus is followed by closure. I should like to urge the necessity of this being done thoroughly in order to be effective. It is often unfortunately the case that the medical officer simply goes after this with a curet, in a bleeding field, and he may or may not succeed in finding the cause of the persisting sinus. A tourniquet should be used, the sinus excised by an elliptic incision to its bottom, the edges of the wound retracted, so that the cavity may be inspected, and the foreign body removed by forceps. There is no need of using a scoop, and no new areas are opened up to infection. This same course should be followed in all cases of osteomyelitis with sequestrums, and if the bone sinus is properly beveled, so that the cavity left is funnel shaped with its base outward, healing will readily follow. If there is no foreign body, the excision of the rigid sinus wall will allow the sinus to collapse, and healing will take place.

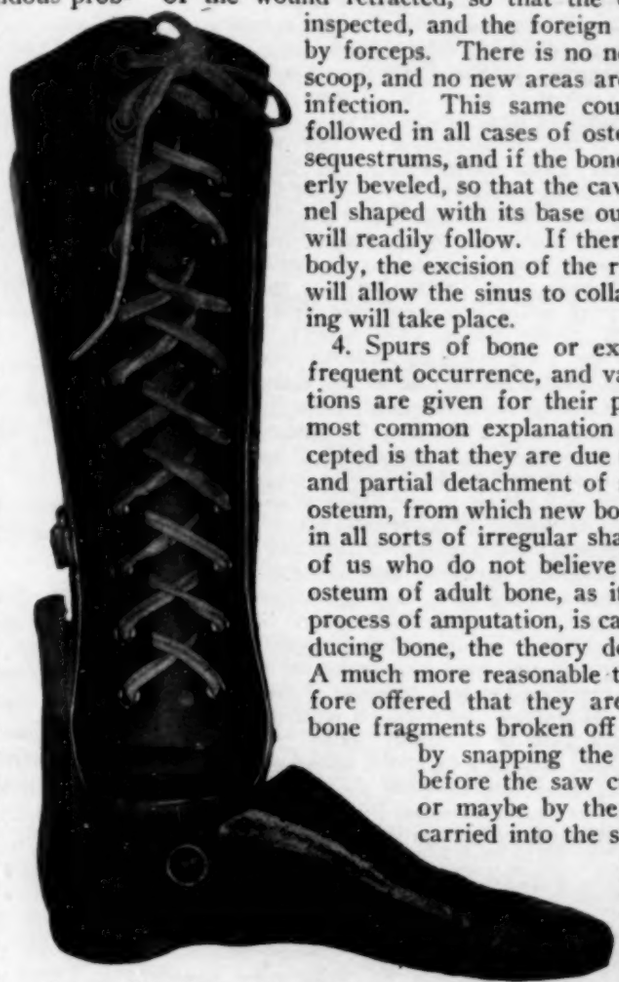

Fig. 1.—New Syme apparatus.

4. Spurs of bone or exostoses are of frequent occurrence, and various explanations are given for their presence. The most common explanation given and accepted is that they are due to a tearing up and partial detachment of shreds of periosteum, from which new bone is developed in all sorts of irregular shapes. To those of us who do not believe that the periosteum of adult bone, as it is stripped in process of amputation, is capable of reproducing bone, the theory does not appeal. A much more reasonable theory is therefore offered that they are due to small bone fragments broken off by the saw, or by snapping the last small bit before the saw cut is complete, or maybe by the sawdust itself carried into the soft tissues surrounding the bone end, developing bone which in time becomes attached to the bone end. So firmly am I impressed with the last mentioned possibility that I have invariably followed the rule, in all amputations, of thoroughly washing off the cut surface of bone and soft tissues with an antiseptic solution previous to closure of the wounds. Roentgenograms of stumps so treated show in practically all instances no spur formation. The presence of spurs, on the other hand, is not sufficient justification for their removal, for we are convinced that in the great majority of cases they give no inconvenience, particularly if the patient has not seen the roentgenogram, and is therefore not aware of their existence.

5. Nerve buds or fibroneuromas are not infrequently found, and being tender to touch, and often a source of discomfort to the patient, call for treatment. These neuromas are formed by the nerve fibers and sheath

cells growing out from the cut end of a nerve and, finding resistance, curling back on themselves, forming a bundle or bulb which is always tender to touch, and refers pain to the terminal portion of the extremity supplied by such nerves. Numerous suggestions have been made for the prevention of the formation of these buds with only partial success. The oblique cutting of the nerve, the fish-tail section, the stripping back of the sheath, cutting the nerve at a higher level, and then tying the sheath over the cut ends—all these methods are advanced, with the greatest amount of success probably following the last named method. The nerve should always be cut back far enough to prevent its inclusion in the healing scar, and if deeply buried in muscle tissue will usually give no trouble. Attention is especially directed to the fact that the mere presence of nerve buds, tender to pressure, is not in itself sufficient reason for operative interference. Operation should be reserved for those cases in which the nerve is obviously caught in scar tissue, or is so placed that it will likely be pressed up by an artificial limb. Pain may be caused also by cutaneous nerves being caught in the scar, and the subsequent contraction produces irritation. This is overcome by the excision of a portion of the scar and the removal of the adherent nerve.

### NONOPERATIVE PROBLEMS

1. Edema persists in most stumps for some weeks after all wounds are healed. No permanent appliance should be applied until this has subsided, and the atrophy of unused muscle tissue has taken place. The disappearance is hastened by suitable pressure by bandage, together with massage of stump. It is more efficiently treated, however, by the additional use of a temporary peg, with plaster or leather bucket. Deformity is nearly always present in a greater or lesser degree in the joint above the amputation. This is due to contraction of the muscles controlling the joint, to long continued flexion position, to adhesion of opposing muscles to one another and to the bone, to infection or infiltration with blood, or it may be due to adhesion from infection or blood in the joint itself. The milder degree of this deformity may be corrected by massage or by manipulation with the leverage obtained from the use of a temporary peg or skeleton arm in the gymnasium or therapeutic workshops. The severe degrees of deformity, especially of the knees, may require forcible manipulation by means of a hinged plaster cut across on the flexed side and wedged after daily manipulation. The various types of elastic pressure, and hinged steel braces with reverse screws have not proved as satisfactory as the well padded plaster splint with wedging.

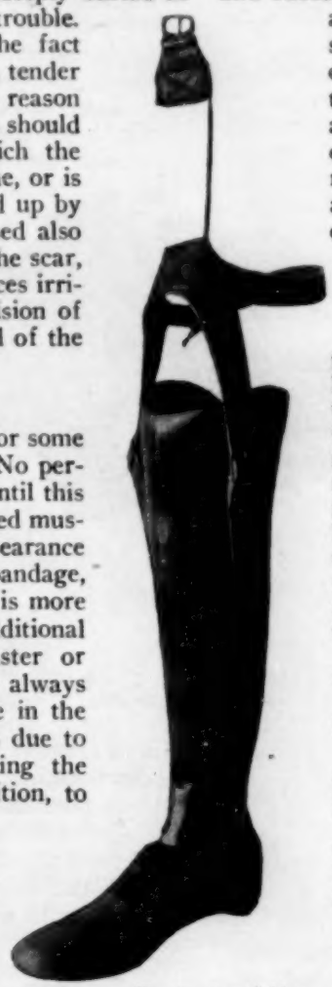

Fig. 2.—A useful leg for long stumps below the knee.

2. Loss of muscle power as a result of disease exists in all amputation stumps, and a considerable training is necessary before the stump is in a good condition to swing an artificial appliance, and make good use of it. For the purpose of improving muscle tone, regular classes are formed in the gymnasium and workshops. At this stage all men with amputations carry on certain work in gymnasium or therapeutic workshops, to encourage confidence and balance, and to strengthen muscles. Special exercises with wall weight and pulley machines, walking in pegs, between parallel bars, leg bowling with specially constructed peg, racquets, and badminton with skeleton arms are all part of the scheme to develop better stumps. In the workshops, wood work, steel metal work, leather work, boot making and repairing, painting, drafting and printing are all found of value along similar lines. The foregoing exercises and games are not only physically developmental, but they tend to improve the morale, and successfully bridge the gap between hospital life and civilian occupation. In order to insure systematic and uniform treatment of this class of patients, when there were so many that one officer could not personally supervise and control the treatment of each patient, a circular of instruction was issued to each medical officer who had anything to do with amputation cases. I give herewith the copy of instruction.

### FITTING OF AMPUTATION CASES WITH SATISFACTORY ARTIFICIAL LIMBS

It is desired that soldiers being fitted with artificial limbs should not be discharged until they have been fitted with a limb to the satisfaction of the surgeon concerned, and that the soldier at the time of discharge should have sufficient training in the use of the artificial limb to establish its suitability and a reasonable amount of dexterity in its use prior to his entering employment in civil life. For this purpose it has been decided that such cases will be graded as shown below and that the soldier will progress from one class to another as rapidly as his physical condition and adaptability to the new appliance will warrant.

1. Cases requiring surgical treatment, such as reamputation, removal of sequestrum, etc.

2. Cases in which the stump is healed, but which have some joint stiffness or edema of the stump. This class will be given passive treatment, such as massage and manipulation of the joint, to improve the action.

3. Graduates of Class 2, both upper and lower extremities equipped with skeleton arm and peg leg who may be given active treatment, such as gymnasium work, playing rackets, bowling, etc.

4. Cases of Class 3 who have improved to such an extent that they may be allowed to use the skeleton arms and peg legs in the workshop.

5. Cases supplied with permanent artificial limbs continuing work as in Class 4 for one month prior to their discharge.

### A CONSIDERATION OF THE VARIOUS TYPES OF AMPUTATIONS

The necessarily brief character of this paper makes it impossible to consider the problems associated with each individual type of amputation; but some of the amputations may be dealt with to serve as examples.

In the lower extremity, an amputation of the toes, provided the plantar flap is brought up on top, is almost no disability. One toe should never be left, as it soon becomes distorted, and adds no element of usefulness. The tarsometatarsal amputation can be made very satisfactory if the peronei are left intact on the outside, and the tibials on the inside. The midtarsal amputation results in an unbalanced foot with elevation

of the heel, and downward pointing of the foot. This form of amputation cannot be properly fitted with either artificial foot or boot, and should under all circumstances be reamputated and made into a Syme amputation.

The Syme amputation is theoretically and practically the best in the lower extremity, and yet it is surprising how many of these are faulty. The chief defect is too long a flap, or too much bone removed from the end of the tibia and fibula, resulting in a bearing end which is not stable, and which rolls forward or to one side. This can be remedied by taking a cuneiform section of soft tissue from the anterior portion of the flap, thus diminishing the size of the walking pad. If the surfaces of the malleoli are trimmed down at the same time, a better artificial appliance may be fitted.

In the leg an amputation should not be done within a hand-breadth of the ankle, in order to give ample room for an ankle joint properly placed in an artificial leg. Above this point the longer the stump can be made, the better leverage is given, and consequently the easier the man will walk, and the less limp is developed.

The term "seat of election" as applied to leg amputations should be dropped, as it is a constant source of confusion. Below the knee there is a point at which the stump is so short as to be useless. The test of this point is the complete flexion of the stump; and if the continuation of the line of hamstrings is in the same plane with the face of the amputation stump, a suitable artificial appliance cannot be applied to utilize the natural movements of the knee.

Fig. 3.—Pelvic cradle, or "tilting table," for disarticulation at the hip.

A knee-bearing apparatus for this type of amputation, or a disarticulation at the knee, is a clumsy type, and not easily or firmly fitted, and as a consequence a supracondylar amputation is preferable. In the thigh, as in the leg, the longer the lever the better the artificial limb may be used. The Gritti-Stokes is the best of the thigh amputations, and is to be selected in preference to the knee-bearing. This gives a very good end-bearing stump when the operation has been well done, and yet there are a good many of these stumps which are not good. The chief fault is a lack of close approximation of the patella to the cut end of the femur, and in consequence a nonunion with slipping or unstable surface, or a malunion, the patella becoming united in an oblique plane. These defects should be remedied before attempting to fit an artificial limb.

All other amputations of the thigh give no serious problems, other than those already considered in general problems, until the upper part of the thigh is reached. A stump under 5 inches in length from the perineum can scarcely ever be fitted with an artificial leg without a pelvic band, and all such should be so fitted. Amputations at the level of the trochanter minor or above, including disarticulation at the hip, have insufficient leverage to use a thigh bucket, and a pelvic cradle, the so-called "tilting table" of the English manufacturers, must be adopted, with automatic lock joints both at hip and knee.

The end-bearing stump is of great assistance in permitting the easy locomotion of the wearer of an artificial limb, but aside from the two types, a Syme in the leg and a Gritti-Stokes in the thigh, a complete end-bearing stump is never possible. It is possible both in the leg and in the thigh to get a partial end-bearing stump in a good many cases, properly supplied with a good pad over the end of the bone. This partial end-bearing stump is best accomplished by means of the hammock suspended in the bucket, by means of which the wearer may graduate his weight bearing.

In the upper extremity, problems present themselves, chiefly from the fact that up to the present time mechanical appliances have not yet been devised which satisfactorily act as substitutes for the lost member. Any of the digits which can be saved in a useful position may be found of great assistance as an opposing factor to a mechanical appliance. On the other hand, fingers whose tendons, both flexors and extensors, are hopelessly tied up, and the joints of which are destroyed by the overgrowth of the fibrous capsule, may be advantageously sacrificed to make way for a hook or some similar device. At the wrist, the whole carpus is rather a detriment than a benefit, and should not be saved, especially when the carpal joints are fixed. The artificial appliance supplied to such a hand will be long and cumbersome and not easily manipulated.

When possible, the radio-ulnar articulation at the wrist should be maintained, as it permits of the most useful movement of pronation and supination. In the forearm, the length of stump is the chief factor in determining the usefulness of the arm, as each inch of stump adds materially to the leverage, and therefore to the power of such arm. A stump of 1½ inches or less below the fold of the elbow is useless, as it pulls out of the bucket in attempts at flexion. When movement alone is of value, even if no power can be developed, a leather cap over the short stump with a compound lever may be utilized successfully.

As in the knee, a disarticulation at the elbow is not so readily fitted with an appliance, as an amputation just above the condyles of the humerus. With a stump shorter than 3 inches in the upper arm, a controlled artificial appliance is not yet supplied, although attempts are being made to reach a solution of the difficulty.

For disarticulation at the shoulder, only a sleeve filler may be supplied, and it is found that very few of the men with such amputation care to wear the appliance, as it is difficult of adjustment, and adds materially to the time it takes a man to dress.

### ARTIFICIAL LIMBS

As previously indicated, the supply of all artificial limbs and orthopedic appliances is under the department of Soldiers' Civil Reestablishment, and the policy of the department, in cooperation with the consultant in orthopedic surgery, has been to establish a standard limb for all types of amputations. This has been possible of accomplishment most successfully in regard to the lower extremity, but unfortunately the difficulties of finding any appliances suitable for amputations of the upper extremity has been so great that constant changes have been necessary, and it is only just now that the department is arriving at a point that permits that the arms may be more or less standardized.

A rather important development of the work has been the establishment of a mechanical research department, which has nothing to do with the factory output, and the mechanicians devote their whole time to the study of problems, and working out of mechanical ideas, brought to them from any source through a central research committee. This laboratory has already resulted in much good, and as fast as any improvements are made, which have passed the test of the committee, these are incorporated as part of the standard type. The policy has been to furnish a permanent peg and an artificial limb to each man who has an amputation of the lower extremity, and a working arm and a so-called dress arm to those who have an amputation in the upper extremity. The attempt to combine the two arms in one appliance has not been satisfactory.

### THE PEG LEG

The peg leg is a temporary appliance based on the Thomas knee splint. It has a shaped ring at the top, taking the top of the bucket of the artificial leg as a pattern. This takes the bulk of weight on the tuberosity of the ischium, and eliminates the troublesome pressure on the perineum. The ring is well padded and leather covered. A little behind the center of the ring, two steel bars drop to a point well below the stump, where they unite in a ferrule, into which is fitted a wooden peg ending in a wide rubber walking pad. A leather bucket is attached to the posterior half of the ring only, and by a loop around each side bar. The lacing is made smaller than the circumference of the thigh, so as to permit snug fitting, for the purpose of shrinking the stump. A hammock is slung in the lower part of the bucket to permit of padding to encourage weight bearing, or short of that to keep up even pressure on the stump to prevent local edema. This whole splint is suspended from the opposite or both shoulders by the usual webbing braces. The peg without joint at the knee for above-knee amputations has been selected because, from the evidence of the men themselves, it has been established that they get about more securely, and walk better and with more confidence than they do with either a peg with flexible knee joint, or with a temporary leg of the usual pattern. In the more or less shaky condition that these men are, when they first start out to walk with artificial appliances, it is easily observed that they walk with much more confidence in the peg than with the knee joint. A lock joint at the knee may easily be added, if thought desirable, so that the man may sit without the peg sticking out too far in front. The statement often made that men who learn to walk with a peg get a bad gait, and tend to throw the peg to the outside, and carry the foot around the circumference of a half circle, is not borne out by facts. If a man walks in such fashion with a peg it is an evidence of the fact that the peg is too long, and he must either swing it round, or elevate his pelvis on that side to permit of its coming through straight. All pegs should be at least three-fourths inch shorter than the corresponding leg.

Fig. 4. — Permanent peg for above-knee amputation.

The plaster pegs were used at first in our work, and proved very satisfactory for purposes of shrinking, but the lifetime of the average plaster peg was only three months, and had nothing artistic about it to recommend it to the average soldier. There was an evident necessity also for a permanent peg, as on occasions the permanent leg requires repairs, and the peg acts as a substitute. Some men with amputations also find it the greatest comfort to exchange the artificial leg for a light peg at some part of the day to rest the stump, and many men doing heavy work prefer to work with the peg, and change to the artificial leg in the evenings or on Sundays. A flat sandal affair or wooden foot is sometimes attached to the peg to facilitate walking in soft earth.

Wood was selected for the bucket of the standard limb because it appeared that it is worn the most comfortably of any of the materials used for the purpose. It does not sweat and macerate the skin; it is lighter than leather, and once having been fitted accurately, does not change its shape. This is especially true of the below-the-knee type.

The standard limb is made of seasoned willow, in a general way, after the Hanger type; the toes are of felt, the foot of maple, the ankle bushing is of bronze working in leather, and is bolted through the bottom of the foot. The knee is of the usual type with control from inside the bucket, of the modified Rowley pattern. Below the knee a wooden bucket is always used for 4 inch stumps or longer, and a slip-socket double leather bucket for shorter stumps.

### ARTIFICIAL ARMS

After thorough trial it has been found that the very complex mechanical arms are not satisfactory, and they have been eliminated. They are found heavy, with the greatest weight at the point farthest from the body, namely, in the hand. They are for the most part of metal, and in our western country are claimed to be very cold. Their complexity makes repairs frequent, so that the limb spends a great part of its life in the workshop. Simplicity has been aimed at, and the nearer we can come to this ideal, the better the product. A light dress arm of wool controlled at the elbow from the opposite shoulder with a catch lock that will fix the joint in three positions, or released, will allow the joint to play free, with a detachable hand and

controlled spring thumb, is the type supplied for all above-elbow amputations. For the forearm, the same pattern without elbow control, and a leather corset about the upper arm is substituted. The working arm is a simple leather bucket, reinforced with band steel to which is attached a short steel tube into which may be inserted a special clasp hook, devised in our workshops, or a lighter hook of the Dorrance type.

A recent development has been what we call the "Canada" arm, which, in addition to the arm described above, may carry an elbow joint controlled from the opposite shoulder, and a short forearm steel tube into which may be fitted the utensils noted above. As the appliances, such as forks, knives, hooks, safety razors or similar appliances, all are of standard type, they will fit any arm either above or below the elbow. This short forearm device may carry a hand on a long stem with gauntlet, so as to obviate the necessity of changing to the dress arm on completion of work. For long forearm stumps, a bucket with soft leather sleeve to lace above the elbow, after the Williams type, into which our standard appliances may be fitted, is found the most serviceable.

After all one's ingenuity is exhausted, and every device has been tried, it is still found that it is difficult to fit some men with apparatus with which they can "carry on" in civilian life, unless one can instil into them that element which seems to be lacking, namely, personality or character. On the other hand, it is impossible to prevent others who have this character in large measure from doing anything that "any white man can do," as one of them expressed it, even if their appliances are crude or home-made.

For this reason every effort is made by encouragement, by example, by contact with others similarly afflicted who are able to accomplish useful tasks, and by training and enthusiastic support of the medical officers to improve the morale of this type of afflicted patient.

Fig. 5.—Permanent peg for below-knee amputation.

**Poisoning with Potassium Chromate.**—A pharmacist at Breslau made up a salve for treatment of scabies at the public clinic for skin diseases, and by mistake used potassium chromate instead of the sulphur ordered. A number of persons were severely poisoned by it and twelve are said to have died, according to the *Nederlandsch Tijdschrift*. Burning pain was complained of at once and some vomited. Two soldiers developed serious symptoms, fever, dark brown and bloody urine and albuminuria the twenty-seventh hour after the application. A number of those affected developed anisocoria and retinal hemorrhages, but the most threatening symptom was the inhibition of kidney function. The employment of venesection, diuretics, intravenous injections of sugar and decapsulation of the kidneys failed to display any favorable influence.

# AMPUTATION STUMPS IN RELATION TO THE FITTING OF ARTIFICIAL LIMBS *

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One of the most useful by-products (if we may use the term) of the unhappy war just closing would be the proper recording and preservation of all experiences—especially in surgery—that may be of future value to humanity. The object of this paper is to open for discussion some of the observations made during the present war.

There is very little published information on the subject of amputation. Volumes have been written on surgery with only a casual reference to this most important branch of orthopedic surgery.

It is recognized that in the field many amputations must be primarily life saving operations; but the dominating idea in the performance of every amputation, next to that of saving life, must be the suitability of the resulting stump for the fitting of an artificial limb. The site and often the method of a primary amputation are mainly determined by the injury, the amount of shock, the severity of the septic infection, and the environment. Rapidity of operation must occasionally be the dominating consideration. Amputations undertaken under war conditions cannot, therefore, always yield the stumps best suited for the fitting of artificial limbs and subsequent operations often become necessary.

While the exigencies of military practice are responsible for many unsatisfactory stumps, some, it is to be feared, are due to an insufficient appreciation by the surgeon of the qualities necessary in a stump if the greatest possible benefit is to be obtained from an artificial limb. It is necessary that the surgeon should not only be concerned with the amputation itself, but also should have a knowledge of what the fitter of an artificial limb requires of a stump, so that the combined efforts of surgeon and fitter may obtain better results than they have been able to do in the past working separately. As a rule, the surgeon gives little attention to the fitting of artificial limbs and rarely sees his patient after the healing of the wound, but turns him over, usually without supervision, to the artificial limb maker. Thus the surgeon loses one of the most valuable means of control in the perfection of his technic, and

* Read before the Section on Orthopedic Surgery at the Seventieth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1919.

frequently errs in comparatively small details which a knowledge of the fundamental points of the artificial limb maker's art would enable him to avoid. In brief, if the surgeon had clearly in mind, from the prosthetic point of view, the essentials of a good stump he would be better equipped to carry out that system of treatment which will restore a man who has suffered an amputation to the greatest functional efficiency.

An ideal amputation should be of such a length as to enable the artificial limb maker to fit the most useful type of limb built to perform as nearly as possible the function of the absent member. The stump should be covered by skin and subcutaneous tissue just slack over the end, and freely movable. There should be no redundant skin or pointed corners. There should be a firm nonadherent scar or cicatrix, the scar should be linear and placed where it will not be subjected to pressure or irritation by the artificial limb. The edges of the skin about the scar should not be turned in. The stump must be entirely free from pain or tenderness. The principal nerves should be cut as short as possible at the primary amputation. There should be no superficial or deep edema. There should be shrinkage and consolidation of all parts of the stump. The joint next above the amputation should possess full range of voluntary movement. The integument must become so hardened as to be able to bear subsequent pressure and especially is this true of stumps of the lower extremity whose duty is primarily that of a support, and secondarily acting as a lever for moving the apparatus. This leads us to a very brief discussion of the sites of amputations best suited for the fitting of an artificial limb.

### AMPUTATIONS OF THE UPPER EXTREMITY

The importance of preserving as much as possible of the thumb or even of one finger can scarcely be insisted on too emphatically. A thumb or part of a thumb, or finger with fair range of motion and nerve supply intact though there be no portion of the hand to which it can be opposed, is very much more useful than any artificial contrivance. Amputation at the wrist should never be done if it is at all possible to retain any portion of the hand or carpus. Amputation through the pronator quadratus is preferable to a disarticulation of the wrist.

From the prosthetic point of view probably the best site for amputation in the forearm is at the junction of the middle and lower thirds. However, if an appliance is not to be worn, as long a stump as possible should be preserved. The minimum forearm stump measured from the tip of the olecranon process is 3 inches. A forearm stump less than this ceases to exist as a stump anteriorly when flexed. When it is possible to retain only such short portion of the bone, the flexor muscles of the wrist and fingers, the supinator longus and the extensores carpi radialis longior and brevior should be removed at their humeral attachments so as to leave the anterior surface of the forearm stump as flat as possible. Amputation through the elbow joint offers no advantage over amputation immediately above it, since in the former case the satisfactory fitting of an artificial arm is more difficult.

The point best suited for amputation in the upper arm is about 1 inch above the condyles of the humerus. Above this point it is particularly desirable to secure as long a stump as possible. Some power of movement over an artificial arm can be obtained with a stump containing 1 inch of humerus below the anterior axillary fold, but a stump with less than 3 inches of bone forms a poor lever for moving an artificial arm. A short arm stump may be lengthened by dividing a portion of the pectoralis major and teres minor tendons and thus raise the anterior axillary fold. It seems advisable to retain any portion of the upper end of the humerus even if only the head, rather than remove it since the appliance is fitted much more easily when the glenoid cavity is filled.

### AMPUTATIONS OF THE LOWER EXTREMITY

Amputation of the toes requires a "Planter flap" to get a good result and this is rarely available. A single toe should never be left as it will become deformed and painful. Amputation just back of the head of the metatarsal bones, in front of the attachment of the tibialis and peronei muscles, gives a very useful foot. The tarsometatarsal disarticulation (Lisfranc's operation) sometimes gives a very useful foot provided the ends of the tarsal bones are well covered with a Planter flap. A midtarsal disarticulation (Chopart amputation) is usually unsatisfactory and sooner or later a condition of equinus is likely to result, due to contraction of the unopposed calf muscles, and walking becomes difficult or impossible. Both Pirogoff's and subastragaloid amputations give stumps which make very difficult the fitting of effective artificial limbs. The Syme amputation is preferable to a Pirogoff as it gives more room for an ankle joint mechanism and avoids the difficulty frequently encountered in keeping the end of the os calcis in position. A Syme which is not entirely end-bearing is inferior for functional purposes to an amputation through the leg. The most favorable site for amputation in the leg is the middle third with a from 8 to 9 inch stump. Below this point the stump is not so satisfactory for end-bearing and the fitting of an artificial appliance is more difficult and the flaps are usually wanting in vitality. Above this point the leverage power is diminished. With proper surgical precautions an end-bearing stump should be secured at this level, and with a good modern artificial leg the gait should be practically normal. Many artificial limb makers prefer amputation at this site of the leg to any amputation back of the toes. Fair results have been obtained in fitting in a case with as little as 2 inches of tibia; but a stump as short as this is usually inadvisable, as it ordinarily will have to be fitted with the older type of knee-bearing leg, with the tibial stump bent to a right angle. However, a below knee appliance supplemented with perineal bearing, has given very satisfactory results in this type of case.

Amputation through the knee gives a very satisfactory stump with good end-bearing, provided the condyles are amply covered, preferably with an anterior flap. Under septic war conditions implantation of the patella on the cut surface of the divided condyles (Stokes-Gritti) is apt to be followed by displacement of the patella, by nonunion, or necrosis. When the union between patella and femur is complete, the results have been very gratifying. In the thigh the best amputation is one just above the condyles. Above this point all the length possible should be saved.

Unless 2 or 3 inches of bone below the lesser trochanter is left, a very unsatisfactory thigh stump results and it is practically impossible to fit the stump with a thigh bucket. If 2 inches of bone below the lesser trochanter cannot be saved, reamputation should be

done through the neck of the femur or through the hip joint. It is now possible to fit an exarticulation of the hip with a very satisfactory appliance called the "tilting table." In many cases the gait is even better than the shorter thigh stumps fitted with the thigh bucket.

In fitting an appliance one should make the amputation stump and the artificial limb one. This can best be done by the cone principle. Every stump through a smaller or greater part of its extent resembles a cone with a base upward. When this condition is utilized every change in the form of the stump, through pressure, only tends to make the fit more secure and perfect.

The American artificial legs are efficient and since the beginning of the war little effort has been expended on this feature of the problem. However, considerable has been done in attempting to improve provisional appliances. In the treatment of civilians with amputations the artificial limb makers recommend the use of numerous stump shrinkers. This is merely an admission by them of the advisability and necessity for the early fitting of a provisional limb. During this period the amputation stump is constantly changing in size and shape. To fit a man at this time with a permanent type of prosthetic appliance would be a costly and unprofitable procedure. The artificial limb makers have recognized this difficulty but have not been able to solve it satisfactorily. It has been the practice of those with an amputation of the lower extremity to use crutches for ambulatory purposes. In so doing the stump is left hanging as a useless appendage, not participating in the movement of walking and if sufficient time elapses disuse and atrophy result. The use of crutches always results in a bad postural attitude which is very difficult to correct, to say nothing of crutch palsy and other complications which may develop. A provisional limb, under the plan now followed, is fitted at a very early date after the amputation, often before the complete cicatrization of the wound. In so doing the stump comes quickly to participate in the action of walking, thereby developing its muscles and nerves under the control of the spinal and cerebral centers. The parts of the stump are energized thereby and their new functions developed. The balance of the body is adjusted to the new condition and the equilibrium is established. The shrinkage of the amputation stump to its new dimensions is rapidly secured. The mental effect is likewise of service, so that from all points of view the early application of the provisional limb is desirable. The cost of the provisional limb should be as low as is consistent with effective service, because the rapid changes in the dimensions of the stum necessitate frequent changes in the provisional appliance.

Probably the most satisfactory all around provisional appliance so far devised has been made of plaster-of-Paris. With moderate skill practically every amputation stump can be fitted with this form of provisional appliance. The materials needed are simple and are available to practically every surgeon.

The bucket or socket is made of plaster of Paris, applied in the form of bandages carefully molded to the stump, so it supports the usual bony prominences and in addition exerts even pressure on the entire contour of the stump. It has the advantage that the pressure can be modified to comply with the characteristics of any particular amputation stump. Artificial legs or set-ups without sockets (either for above-knee or below-knee cases), to which the plaster socket can be attached, can be purchased from the artificial limb makers and should be kept in stock.

The chief difficulty in devising an appliance capable of performing the work done by the lost hand is due to the high degree of differentiation in the hand functions. When a leg is lost the chief requirement to be met is support and hence no complicated mechanism is required. An artificial arm of similar construction would serve little more than a cosmetic purpose. The usefulness of a natural hand depends on these factors: First, rapidity and precision of movements; second, strength, and third, a sense of touch.

Strength is the only one of these requirements for which it is possible to make adequate provision in the artificial arm. Since only two pulls are usually practical in an artificial hand it is evident that its usefulness will be necessarily restricted to grasping movements of a very simple nature. Thus, it is obvious that the one-armed man will use an artificial arm only for a few and relatively simple acts. Most important acts will be done with the remaining hand. In an armless person the problem is entirely different. Instead of provision for the few and relatively simple acts required by the one-armed, the demand now is provision for every act possible, yet the means at our disposal are the same. Practically every armless person wears very simple artificial appliances with various forms of attachments designed to do the simple things which will make him independent after he has obtained sufficient skill in their use.

### CONCLUSIONS

1. The amputation stump should have a satisfactory length, a good mobile covering, a firm nonadherent cicatrix so placed as not to be subjected to pressure or irritation by the artificial limb, a freedom from pain and tenderness, and absence from edema, a shrinkage and consolidation of all parts of the stump, and a free normal mobility of the joints above.

2. The surgeon should have clearly in mind the sites of amputation best suited for the fitting of an artificial appliance.

3. The surgeon should have a knowledge of the artificial limb makers' requirements of a stump and also a knowledge of the fundamental points of the artificial limb maker's art.

4. Experience has proved the value and wisdom of using provisional appliances in the early treatment of men with amputations, and it is hoped that there will be a universal acceptance, by surgeons, of this as the approved method of treatment.

5. However perfect a prosthetic appliance may be, it must be remembered that it will never reproduce the anatomic and physiologic characteristics of the amputated limb, and will never actually replace the lost member, but observation of many cases shows that faithful and intelligent practice, under guidance, will add immeasurably to the effectiveness of the artificial limb.

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## ABSTRACT OF DISCUSSION

### ON PAPERS OF DRS. STARR AND ROSE

Dr. Philip D. Wilson, Columbus, Ohio: I wish to commend particularly the remarks Dr. Rose made about the necessity of surgeons learning the sites of amputation that will give the best results with artificial limbs. I should like

to comment on the forearm amputation. It has been found that a stump less than 3 inches below the elbow is not useful. The biceps tendon has a tendency to work off the bucket in contractions of the forearm. Against this must be urged the fact that artificial arms are not successful. The experience in foreign countries is that less than 20 per cent. of those who have artificial arms wear them, if they have one good hand. We must consider that against the advisability of converting a short forearm stump into an upper arm amputation. A forearm stump without apparatus is useful as a support for paper, and in many other ways. We have seen demonstrations of how men with double forearm amputations can, without wearing appliances, do a number of things by using their forearm stump as a kind of large finger.

The plan of lengthening an upper arm stump by cutting the pectoralis major and the anterior and posterior axillary folds has been suggested; but it seems to me doubtful whether such a stump can be lengthened sufficiently in this way to make the operation worth a great deal. In the foot, I would speak of Symes' amputation, which is being developed principally by the English. The results with it have been exceedingly good, but they are dependent on making this stump fully 100 per cent. end bearing. It usually is made with two redundant flaps, which have a tendency to evert, turn over and, in the end, produce a painful stump. By a little careful tailoring and attention to detail, this can be remedied; and attention to the nerve endings is extremely important. The site of election for an amputation of the leg is said in the textbooks to be 4 inches below the knee. That is based on the idea that such mutiles should walk with the knee bent. The modern conception is that they should never walk with the knee bent. A man is better off with an amputation above the knee than he is walking around on one of those old bent knee affairs. When the stump is less than 9 inches below the knee, we should try to save every inch we can. The Stokes-Gritti amputation is not necessary. The matter of end bearing of a stump is more a question of the after-treatment of the patient than of the type of operation. By the inauguration of gradually increasing end pressure exercise, as described by Lyle, three or four years ago, the stump can gradually be toughened so that full pressure can be borne on the stump end. Even when this is done, however, the value of such a procedure is very doubtful. The artificial limb makers, in actual practice, do not utilize it. That is partly their fault, but there is a reason for it. It is almost impossible to fit an artificial limb in such a way as to divide the pressure equally between the end of the stump and the tuberosity of the ischium. Unless pressure is put on the latter, the leg lacks stability and there is a tendency to turn. The introduction of plaster-of-Paris legs should be generalized. Getting the patients up as early as possible on these provisional legs, the functional results will be improved 50 per cent. and will be reached in one-third the time.

DR. REGINALD H. SAYRE, New York: One of the bothers with amputations is the old ulcerated stump. In a case of edematous stump with a large ulcerated area, which had existed for four years, I operated just as I would on any varicose area, slitting it all around and applying pressure to prevent the edema. I found difficulty in keeping pressure on the end of the stump, and I employed a procedure that was then new to me. After scarifying the ulcer, I made compression and put adhesive plaster on the sides, front and back of the thighs, with eyelet holes at the lower extremity I then made a cross of adhesive with eyelets at the four ends and put a dab of balsam of Peru on the ulcer. I fastened the cross of adhesive to the other adhesive strips by means of elastic strings passing through the eyelets and pulled as tight as possible on the side. In the course of six months, the thigh had healed up and the patient had a perfectly good stump. Just as in ulcers of the shin, the fundamental necessity of relieving the edematous condition of the leg by equitable pressure does not seem to be appreciated. I have brought this forward as a practical method of getting rid of it in these ulcerated stumps. Another man had been operated on three times before he came under my observation, for thrombo-angiitis obliterans. This man had an unhealthy and crooked stump. At the last operation, his stump had contracted at an angle of 45 degrees, and it was impracticable for him to wear the curiously contrived artificial leg with the wobbling bucket, as he had to let this rudder stick out at the back while walking. I straightened the knee. A plaster-of-Paris bandage was applied around the thigh and stump, the plaster being held in position by adhesive running up the thigh and then incorporated in the plaster of Paris to keep it from turning over. When it was hard, the plaster shell was sawed in two, and a wedge of wood was put in behind the knee with a band of plaster of Paris around it to hold it in position. It was removed in four days, and a larger wedge of wood was inserted. This was repeated at intervals, until we got the leg into a straight position. I have found this a practical way of getting these legs straight. Later, as the scar tended to open every time he stretched it by using the artificial leg, a piece of adhesive plaster was put across the scar after it had been pulled together to relieve the tension on the cicatrix until it healed up.

DR. JABEZ N. JACKSON, Kansas City, Mo.: It is striking how little attention is paid to anatomy in the ordinary textbook description of amputation, and, I think, that a great deal of dissatisfaction with the stumps is dependent on this. We are told to cut down to the fascia. I think it is better to cut through the fascia and lift up the fascia with the skin. Do not close the wound by a through and through stitch. Suture accurately the aponeurosis of the muscles and close the skin separately. If this fascia is brought over and sutured separately, you can close the skin with any kind of stitch.

DR. REGINALD H. SAYRE, New York: I should like to hear whether any one has had experience with Vanghetti's kinoplastic operation for getting muscles and tendons that will be able to manipulate the fingers in upper arm amputation.

DR. EDWIN W. RYERSON, Chicago: Huber, of the University of Michigan, has shown that if the last three fourths of an inch or 1 inch of nerve be injected with alcohol at amputation, no neuroma will be formed. As Dr. Starr says, the neuroma is formed by the growing down of the neurofibrillae and the formation of a painful bulb. If this simple technic of injecting with alcohol is observed, there will be no growing down and no neuroma. No neuroma is formed above the site of the injection, because the neurofibrillae do not proliferate except at the cut end. I think that this method is worthy of a trial, because painful nerve bulbs are frequent.

DR. C. W. HOPKINS, Chicago: One point that I was glad to hear brought out in the discussion was in regard to the site of amputation in the leg in cases where the doctor can use his discretion, when the injury is low down. The general tendency for many years has been to save all of a leg possible, giving the patient a very long stump, by performing the amputation just above the ankle. In my railroad work I have had many men come to me who were operated on years before, requesting that a reamputation be done higher up, stating that the long stump caused a very unsightly bulge in the lower end of the artificial limb, just above the ankle, and that the long stump seemed to suffer considerably from cold and to be in the way generally, and many times developed ulceration on account of poor circulation. We must remember that in wearing an artificial leg, the weight bearing is entirely on the condyles, the length of the stump making very little difference if it extends 8 or 9 inches below the knee. For that reason I have been doing all amputations of the leg at about that point even where the injuries consisted of a destroyed foot or lower end of the leg, and since that time I have found that the patients have had very little trouble and seldom ever return for any further work. There is one point in leg amputations which has not been brought out, and that is the removal of the head of the fibula where the stump is very short. If the leg stump is not over 4 or 5 inches long, or does not leave more

than 4 inches of the fibula, the fibular head should always be removed at the time of the amputation otherwise the patient will invariably experience discomfort by the fibula being pushed toward the tibia which keeps up a constant irritation. I was very glad to hear the remarks made by Dr. Jackson and will say that my own experience has proven him to be correct. I also heartily approve of the early weight bearing or use of a leg soon after amputation by some good method which prevents a long drawn out employment of a crutch, raising the morale of the patient 100 per cent.

Dr. Clarence L. Starr, Toronto, Ont.: All the amputation cases I spoke of were in war conditions. As almost all the men had had anywhere from twelve to fifteen operations, I could not suggest the idea of a reamputation for the formation of an ideal stump. We had to take the material presented and make the best of it. Take the question of peg legs. We all agree that in the treatment of these conditions, the sooner you get the men into temporary apparatus of some sort for walking, the better; and yet the psychology of the situation is so marked that it is difficult to get these men into pegs. For instance, a man appearing with his leg tied up and his trousers leg pinned up, and walking on crutches, does not go far before he is picked up by some kind hearted woman in an automobile and given a ride. If he has a leg on, however, this will not happen. That is a difficult thing in itself to overcome. It is not a question of ideal types, but a question of some of the difficulties that we meet in attempting to deal with these amputation cases. The subject is so large that it is almost impossible to touch the fringe of it. In the question of a double arm amputation, one arm being an amputation 1½ inches below the elbow. One of the speakers said that this would not produce a movable arm. We had that difficulty until we put a small cap over the end of the bucket and ran a compound lever up the arm and then back to the forearm piece. That gives him a double lever, by which he can use a safety razor, a comb and brush, a knife and fork, etc., and he is capable of taking care of himself. He can travel, if necessary, without a valet. A double amputation with that sort of apparatus is in a fairly good condition. It is such problems that we try to meet with the material that we have on hand.

Dr. Philip D. Wilson, Columbus, Ohio: With reference to Dr. Sayre's question about the Vanghetti amputation—my observations in Italy were not such as to convince me that this is a useful procedure. It offers hope from the experimental standpoint, but is not far enough along for us to take it over and make it practical. It cannot be done unless a man has a prosthetic workshop that he is controlling. Tendon and muscle loops are made, the movement of which is to be used to actuate artificial hands; so it is necessary to have in mind the apparatus that is to be made to fit on it. It is not enough to do the operation and say that we have a fine result because the tendon moves an inch. It is necessary to harness it up and make it practicable. Three or four such amputations have been made in the American army, and the three that I know of had to be removed as not practicable.

Dr. E. J. Rose, Gallipolis, Ohio: In civilian practice we do not see the ulcerated stumps that we see in war amputations. In the front area work in France practically all amputations following gunshot injuries were of the guillotine type and the stumps were left wide open. As a result of this method, even if the best secondary method is carried out, large central scars with varying sized ulcers will persist and often times refuse to heal. It has been our procedure in General Hospital No. 3 to treat these ulcers and granulating areas until a sterile culture is obtained. If there is no bone involvement, an excision of scar tissue and a plastic closure is done; however, many cases require excision of a small portion of bone before closure is done. The length of the stump determines to a great degree the mode of operative procedure because the object for which we are working is to obtain the best possible stump for the fitting of an artificial limb.

# UROLOGIC FINDINGS IN DISEASES OF THE CENTRAL NERVOUS SYSTEM

## A STUDY OF FIVE HUNDRED CASES *

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Urologic recognition of disease of the central nervous system is a phase of medicine of such magnitude that physicians should be keenly alert to it. For this reason we have made a comprehensive urologic study of 500 cases of nervous and mental diseases, in the hope of determining definite facts which might serve, in conjunction with our previous knowledge, to insure our intimate acquaintance with this phase of urology and enable us to be an important aid to a thorough neurologic investigation. To be of value an investigation must result in definite findings concerning factors constantly present in organic disease of the central nervous system. These we seem to have made. We have known it for some time, yet, when one reviews the recent urologic textbooks, it is notable that there is a shocking absence of the slightest reference to the fact, though the findings constitute, certainly, one of the most important chapters in urology.

Of the significant urologic observations, the most important of which are loss of sexual power, relaxation of the rectal sphincter and the bladder picture

Fig. 1.—This and the accompanying illustrations are drawings from a cystoscopic examination: *A*, internal sphincter muscle; *B*, floor of urethra; *P*, bladder wall, showing trabeculation.

as revealed by the cystoscope, the last named is the most reliable. Cystoscopic findings in disease of the central nervous system, particularly those affecting the lower segments of the spinal cord, of which tabes dorsalis is the most notable example, are definite, constant and characteristic to a degree that stamps them as being of very considerable diagnostic importance.

* Read before the Section on Urology at the Seventieth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1919.

Since such a large percentage of diseases of the central nervous system manifest themselves initially by disturbances of bladder function, and since so many surgical diseases presenting bladder disturbances are either complicated by or associated with tabes, it is apparent that the recognition of this type of bladder is extremely important.

Owing to the confusion in the interpretation of the term "tabetic bladder," which would seem, as its name implies, to indicate only the bladder associated with

Fig. 2.—*B*, floor of urethra; *C*, verumontanum, showing orifice of utricle; *L*, lateral urethral walls.

locomotor ataxia, we have designated recently the condition in which there is bladder disturbance complicated by or associated with tabes, as the neurogenous bladder, because we feel confident that the findings in the bladder are strikingly suggestive, if not absolutely positive, of neurologic disease, even though in many of our cases there has not been a neurologic substantiation.

Among urologists, there has been considerable discussion as to the characteristic findings in the bladder in disease of the central nervous system, and most of the previous reports on this subject have dealt with the great importance of trabeculation as being pathognomonic, without regard to the internal sphincter. It is our belief that the internal orifice is equally decisive. The combination of the two, however, really forms the definite cystoscopic picture.

### CYSTOSCOPIC EXAMINATION

With the cystoscope in the normal position, there is a feeling of relaxation which one does not get in normal cases. Furthermore, the posterior urethra is usually more tolerant, and in definite tabetics, as is well know, often anesthetic. In a great many instances, the external sphincter is spastic, and if one has passed a catheter before the cystoscope, urine is frequently withdrawn on entering the posterior urethra. The sphincter margin has been found to be without striking apppearance, above and laterally; but as one approaches the floor, the striae of the urethra can easily be seen, external to the sphincter. On depressing the eyepiece of the cystoscope and withdrawing the instrument, one may inspect the posterior urethral floor or the supramontane urethra, its folds, the guttered appearance of the urethra, and the lateral urethral walls being shown (Fig. 1).

On further withdrawal, the verumontanum may be brought plainly into view, the orifices of the utricle and ejaculatory ducts inspected; and, very frequently, seminal ejaculation from the orifices may be observed (Fig. 2). Various degrees of relaxation of the sphincter and prostatic urethra are seen: In some instances, only the first part of the urethra is visible; in others, the whole urethra permits inspection, but indistinctly, and still others show considerable relaxation but do not allow vision.

The first type of pronounced relaxation, with the guttering of the urethra and visibility of the verumontanum, is the characteristic and significant finding in cases of definite nerve lesions. The other types are less positive and seem to occur quite frequently in the presence of a negative neurologic examination, frequently in certain psychoses, but rarely in pronounced organic disease. This group, which may be termed minor relaxations, offers a very interesting series of cases and one about which considerable confusion exists at present. While cystoscopic findings are not positive, they are highly suggestive, and in many instances individuals showing these changes have later presented definite neurologic developments.

These findings are commonly associated with functional disorders, neurasthenias, reflected pains in the perineum, groins and testicles, and general atonic conditions, and it may be that they are representative of a general let-down in physical tone. As previously stated, however, we should always be careful in construing this picture and offering a prognosis to the patient. We have frequently observed these slight relaxations in early syphilitics, in fact, such changes have prompted us, in many instances, to have Wassermann tests taken.

Associated with this orifice picture, the trigon (Fig. 3) is usually elevated, but seldom husky and

Fig. 3.—*I*, tip of trigon, showing elevation and fanlike appearance of trabeculation; *T*, trabeculation.

hypertrophic, as when behind mechanical obstructions; the interureteric bar is usually lifted and thin. Laterally, the trigon at its tips frequently fans out into trabeculae, which spread out over the lateral walls of the bladder. The ureteral orifices show nothing in particular, except that in some cases they are sluggish in their ejaculation of urine. With this picture of relaxation at the internal orifice of the bladder, there is usually bladder trabeculation (Fig. 4), which does not always show particular characteristics, except that pos-

sibly it may be a little more delicate than trabeculation seen back of mechanical obstructions. Koll believes that it has a predilection for the lateral fornices and has a specific appearance; but our cases have not been so definite in this respect, as they have all been more or less generalized, and various grades of trabeculation were assumed.

In the female, the diagnosis is somewhat more difficult, since we miss the anatomic landmarks which serve to illustrate this relaxation. Nevertheless, there is always considerable relaxation of the sphincter, and this, coupled with the trabeculation of the bladder, suggests the diagnosis.

The roentgen-ray findings of the bladder have been interesting. We have made cystograms with thorium, collargol and argyrol. These cystograms have usually shown a clean-cut line below, in the internal sphincter region, while in several of the very relaxed cases there has been a funneling due to the material in the deep urethra, as has been observed at the Johns Hopkins Clinic also. It is quite surprising that this funneling is not more uniform, since one would expect from the cystoscopic appearance of the urethra that it would be so. It is evident that the sphincter tone is sufficient to resist intervesical pressure until some mechanical instrument holds it open. There has been one observation in particular that has been of interest to us. If the bladder is filled with a solution, and comparative plates are taken with the patient lying and then standing, there is noticed in tabetics a dropping down, with forward toppling, of the bladder. This is probably due to the marked relaxation of the various bladder and prostate supports, namely, the ligaments and muscular supports in this region.

Fig. 4.—*B*, air bubble; *T*, trabeculation at dome of bladder.

### RESULTS IN FIRST SERIES

In the series of 500 cases observed by us, 188 were studied with Dr. Francis Barnes, psychiatrist at the St. Louis City Sanitarium, and were cases representing various types of psychoses. In this series, we had no tabulated record of the symptoms, but confined ourselves to an investigation of the urologic findings in the individual patients and checked them with the diagnoses in the sanatorium. In carrying out this part of the work, we were very careful that the cystoscopic and other examinations should be made without prejudice.

All knowledge of the character of these cases was therefore concealed from Drs. Greditzer and Caulk, who made the urologic examinations. This series, including, exclusively, cases of mental disorders, embraced 158 males and thirty females. There were eighty cases of paresis, two cases of tabes dorsalis with psychosis, nine cases of cerebrospinal syphilis, thirteen cases of organic brain disease, not syphilitic, eleven cases of alcoholic psychosis, eleven cases of epilepsy with psychosis, forty-four cases of dementia praecox, six cases of defective states with psychosis, and twelve cases of manic depressive insanity.

In the cases of paresis, 50 per cent. showed typical positive cystoscopic pictures, 38 per cent. of the cases having present or exaggerated knee jerks were cystoscopically positive; while in 74 per cent. of the cases with diminished or absent knee jerks, the picture was positive. Concerning the 38 per cent. of cases in which the cystoscopic examination was positive and the neurologic examination negative, it should be stated that it is claimed that 99 per cent. of all paretics have pathologically demonstrable lesions of the posterior columns of the spinal cord, such as are found in tabetics. It is possible that these posterior column changes may not be of sufficient intensity to produce general clinical signs, but of such character as to involve the segment which would give rise to the bladder changes above described. Cases of tabes with paresis were 100 per cent. urologically positive. Of cerebrospinal syphilitics, 55 per cent. gave urologically positive pictures. We wish to call attention to the invariable positive cystoscopic picture in hemiplegias. Of the organic nonsyphilitic brain diseases, including arteriosclerotic dementia, senile dementia, multiple sclerosis and Huntington's chorea, 30 per cent. were cystoscopically positive, these being the cases of arteriosclerotic dementia and those of multiple sclerosis. Of the eleven cases of alcoholic psychoses, including Korsakoff's syndrome, alcoholic dementia and chronic alcoholism, only that of Korsakoff's syndrome was positive; and it is interesting that the knee jerks were absent, although there were no other signs of neuritis.

Epilepsy with psychosis showed 27 per cent. positive bladder findings.

Of the cases of dementia praecox, the findings were positive in 22 per cent. One of these cases, associated with alcoholism, is interesting because of the positive finding, in view of the fact that at the time of the patient's admission the diagnosis had been paresis but later observation did not confirm it. The percentage of positive cases in this group, more than one fifth, seems high, but we must remember in this connection that there are those who argue for the organic basis of dementia praecox. There were six cases of defective state. In one of these, an imbecile who had had a severe syphilitic meningitis in infancy, there was a positive picture.

Manic depressive insanity contributed twelve cases with negative bladder findings.

In summary of this study of 188 cases of psychoses, it may be said that the neurologic findings were such as to lead us to suspect a positive bladder picture in 25 per cent., whereas this positive picture was found in 50 per cent. If we separate these cases into organic and functional groups, we find that the neurologic and urologic observations practically tally. In other words, the cystoscope reveals bladder findings in a large proportion of so-called functional cases. Dr. Barnes has recently reviewed the cases studied in this series, two years after the previous examination: There has been no change in their neurologic status.

### DIAGNOSIS IN THE SECOND SERIES

The remaining 312 cases were studied in the Washington University Medical School Clinic, at Barnes Hospital and in private practice, and comprise the routine types of organic and functional nerve disorders. Of the previous diseases, syphilis and gonorrhea stand at the head. Forty per cent. of the patients gave a previous history of syphilis, and the same percentage showed positive Wassermann reactions. Seventy-five per cent. of these patients, with cord lesions, gave positive spinal fluid tests.

Definite neurologic diseases, such as tabes, cerebrospinal syphilis, postapoplectic conditions, spinal cord tumor, and paresis, occurred in 46 per cent. of the series. Of this number, the diagnosis was made first in the urologic clinic in 46 per cent. of the cases, a fact demonstrating the frequency with which such diseases manifest themselves by bladder symptoms, and lead the patient to consult the urologist first for bladder disturbances. In 54 per cent. of the cases, patients consulted the neurologic clinic first. Of the cases positively diagnosed by the cystoscopic examination, in only 50 per cent. was the diagnosis confirmed by the neurologist. In about 5 per cent. of the 50 per cent. of unconfirmed cases, lesions have since developed. In this group there were two cord tumors, eventually diagnosed neurologically, in one case a year after we had found a definite picture. The remaining 45 per cent. of unconfirmed cases we have tried to trace, but have experienced great difficulty in getting any replies. Only a few replies have come to our inquiries; the majority of cards read "wrong address." Patients who have returned have remained neurologically negative, but still definitely cystoscopically positive—the smaller group—and cystscopically suggestive, the larger.

### DIAGNOSTIC SYMPTOMS AND FINDINGS

A. *Urinary Symptoms.*—Ninety-three per cent. of the patients had urinary symptoms. Seven per cent. presented no urinary symptoms. Of the 93 per cent. half were definitely neurologic and half unconfirmed. Of the 7 per cent., it was again half and half.

1. Frequency: Frequency of urination occurred in about 60 per cent., equally divided between the confirmed and unconfirmed.

2. Incontinence: Incontinence of urine occurred in 38 per cent. of the series, of which the patients in 63 per cent. proved to be those with definite central nervous system disease. One of the patients with incontinence, who showed a positive picture, but in whom the diagnosis was not confirmed by the neurologist, later proved to have had a spinal cord tumor. Our findings were confirmed at necropsy.

3. Urinary Obstruction: This occurred in 36 per cent. of the cases. Of these, one half were neurologic. In one of the negative cases, however, paresis later developed. Other causes of obstruction associated with this group were stricture, prostatic hypertrophy, bladder tumors, cancer of the rectum, cystocele, etc.

4. Pain, Burning and Urgency of Urination: This condition occurred in 41 per cent., and, of these, the diagnosis in 41 per cent. was confirmed.

B. *Sexual Powers.*—One of the very important and most uniform findings was disturbed sexual capacity. In about 80 per cent. of the cases of organic lesions of the central nervous system there was either complete loss or considerable disturbance of the sexual powers. Of the nonconfirmed cases, 50 per cent. showed this disturbance.

C. *Pain.*—Pain was present in about 70 per cent. of all the cases, being the lightning pains of tabes, and pains in the back, legs, perineum, pubis, scrotum and rectum. A very suggestive pain has been a puckering, pulling pain in the perineum and in the rectum. These are often ascribed to prostatitis and vesiculitis, but frequently indicate nerve lesions and not reflexes.

D. *Uremia.*—One of the chief factors in the production of toxicities in patients suffering from central nervous system disease is uremia. It not only manifests itself with the ordinary obstructive type symptoms, but also serves to augment many of the toxic pains from which these patients suffer. A great deal of the pallor, weakness and dizziness also emanates from this cause. We have noted repeatedly that the relief of the uremic condition of a patient has improved his appearance and symptoms to a surprising degree. Therefore, we feel that the correction of uremia is one of the most important phases in the treatment of the pronounced tabetics.

E. *Hematuria.*—This occurred in 15 per cent. of the series, one third being in tabetics and two thirds in nontabetics. The hemorrhages occurring in tabes are very interesting, and, indeed, very alarming. Hemorrhage often occurs with vesical crisis, and is so profuse that several of the patients have looked almost exsanguinated. These hemorrhages seem to come from both the urethra and the bladder wall, and have been controlled with epinephrin. One patient in this series bled to death from a small incision in the back for the drainage of a perinephritic abscess. With relaxation of pressure, there was profuse hemorrhage, which could not be controlled and which was probably due to a vasomotor phenomenon.

### EXAMINATION

*External Genitals.*—These are frequently flabby. Varicocele is common. Various degrees of penile atrophy have been noticed, and in several instances there have been marked spasms of the whole anterior urethra, so that it was difficult to insert a catheter, and more difficult to remove it.

*Urine.*—Thirty-two per cent. of the patients in all the cases had infected urines; 66 per cent. of these were tabetics; the remainder, the unconfirmed. Furthermore, 40 per cent. of all tabetics had infected urines; 60 per cent. had not. The infections were almost entirely of the colon bacillus group.

*Prostate and Vesicles.*—Sixty-eight per cent. of the patients had prostatitis and vesiculitis. This percentage was divided equally between the confirmed and the unconfirmed. About 5 per cent. of the patients with definite cord lesions had an associated prostatic hypertrophy. This is very important, and serves to emphasize the necessity of thorough recognition of this bladder picture and the advisability of always making a cystoscopic examination prior to prostatic surgery, since the symptoms which seem to be due to the prostate may have their origin in a nerve lesion. It seems certain that many of the unfavorable results following prostatectomy, particularly incontinence, are due to the fact that the prostate has been removed from patients suffering with nervous diseases. Otherwise, incontinence would not result, for it is hard to produce.

*Rectal Sphincter.*—This offers itself as an extremely important symptom, and often creates the first inkling

of suspicion. In our series, we have found it to be relaxed in 88 per cent. of the cases. Indeed, in regard to several patients who were in the medical ward with obscure symptoms, we were able to predict, by the rectal examination, a possibility of nerve lesion, and in several of these cases the predictions have been fulfilled. About an equal proportion of the patients were in the confirmed group. There was normal tone in 8 per cent. In only two instances did this normal sphincter occur in tabetics. Associated with the relaxed sphincter there is frequently a ballooning of the rectum. At times it is very spacious, and, invariably, this combination of relaxation and ballooning is a very important monitor of cord lesions.

*Internal Sphincter and Verumontanum.*—In this series we found the internal sphincter relaxed to various degrees in 98 per cent. of the cases. About 79 per cent. of these relaxations were of such a degree as to allow cystoscopic inspection of the verumonatum. The diagnosis, in 40 per cent. of these cases, was neurologically confirmed; in the remainder it was not. But 80 per cent. of the tabetics had sufficiently relaxed sphincters to allow inspection of the verumontanum, and 20 per cent. had not. This high percentage of relaxation of the internal sphincter in diseases of the nervous system places it as one of the most important criteria. Twenty per cent. of the cases showed internal sphincter relaxation, but not of a sufficient degree to allow inspection of the verumontanum. The condition, in these cases, was associated also with a relaxed rectal sphincter. This group of cases must be repeatedly examined, as such a combination is highly suggestive of nerve lesions.

*Trigon.*—The trigon was elevated and spread out like a fan in 56 per cent. of the cases. Of this number, 56 per cent. occurred in diseases of the central nervous system. It was also observed that 75 per cent. of tabetics had elevated and veiled trigons, whereas, in 25 per cent. the trigon was normal.

*Trabeculation.*—Trabeculation was present in more than 90 per cent of the cases. Of these, 46 per cent. were confirmed. On the other hand, trabeculation was reported in 96 per cent. of the patients with diseases of the central nervous system. This high percentage of trabeculation occurring in organic nerve lesions presents itself as a very important diagnostic finding.

## TREATMENT

There is no type of urinary disease which has received in the past such meager attention as the bladder disorders associated with diseases of the central nervous system. This is particularly true of tabes. The treatment of the tabetic has been one of pity rather than one of therapeutics. And actually, proper treatment is rewarded with quite a degree of satisfaction in a large percentage of such patients. As such a proportion of these cases are secondary to syphilis, general treatment directed toward syphilis is one of our first considerations. From our observations, we are led to believe that patients with active blood Wassermann reactions, from ++ to ++++, are much more controllable than those with a negative or slightly positive reaction. It has been our principle to treat these patients quite actively with arsphenamin and mercury alternately, in order to stop further progress of neurologic involvement (of course one cannot hope to correct old nerve scars; but we believe that one can hope to allay certain nerve symptoms—for instance, lightning pains are often immediately stopped after the administration of arsphenamin)—and also to prevent the virus from involving further nerve structures.

These patients should be kept under very strict hygiene, and their diet and bowels carefully regulated. Urinary antiseptics, particularly acid sodium phosphate in 20 grain doses and hexamethylenamin in 10 grain doses, three times a day, are helpful in the infected cases, and serve as preventives in the uninfected.

*Local Treatment.*—It must be understood that the treatment of a bladder lesion secondary to an old nerve lesion is entirely different from that of one due to traumatic injury. It has been definitely shown that the latter group should be left alone, as the automatic bladder will usually develop, and the condition will frequently take care of itself. The lesion which is secondary to an old nerve lesion, on the contrary, demands a different therapeutic regimen. As has previously been said, this type of bladder has frequently passed unnoticed, the treatment has been neglected, and even patients with overflow have been allowed to go on dribbling. In our experience in handling this series of cases, we feel firmly convinced that these patients can be enormously benefited, many of them made comparatively comfortable, and some, particularly those with early involvements, entirely relieved of every bladder symptom.

The method of treating such bladders varies according to whether or not there is residual urine. This difference in treatment, of course, is in the employment of systematic catheterization in those patients with residual urine. Otherwise, the treatment is similar, consisting, in the first place, in relieving irritability, in keeping the patients clean and in training them to exercise their enfeebled musculature by regular, systematic attention to urination, and by practicing stopping and starting the urine at frequent intervals. This is designed to give more muscle tone and power to the fibers not involved, and, by means of such compensation, enable them to replace the loss of fibers which are destroyed, thereby preventing their injury from overstretching as a result of a chronically distended bladder.

These patients should all receive systematic treatment for the prostate and the bladder neck, such as massage, dilatation, instillations and applications to the urethra; and even though instrumentation has been tabued for this class of patients, we feel that it has been on unjust grounds, since the benefit derived is entirely out of proportion to the occasional slight trouble that it may cause. When careful technic has been observed and gentle manipulation employed, we have seen very few instances of trouble following such treatment, and these slight upsets have been only temporary.

Patients with residual urine, whether infected or not, are treated by regular catheterization and irrigations or instillations. This, of course, for the purpose of relieving the internal pressure and allowing the overstretched muscles which are not neurologically involved to regain control, and it is surprising how promptly a bladder which has held a high residuum for a long period will empty itself. Indeed, in several instances after one or two catheterizations, the residuum has entirely disappeared, and several patients have for more than a year, carried only a few ounces of residuum after only a few catheterizations. The average patient, however, has to be catheterized regularly, that is, daily for a while, after which the interval between

cathetorizations is gradually increased in length, the time depending on the results obtained. As a rule, after a course of treatment, the condition of such patients can be kept under control by weekly or fortnightly inspection. It is very comforting to see many such patients improve in general health. Their previous pallor, weakness and general toxic symptoms largely dissipate. We know of no more appreciative patients in the world than this class.

Since 80 per cent. of pronounced tabetics are suffering with uremia, systematic drainage has the same beneficial effects as in cases of mechanical obstruction. Besides, it allays, in many instances, the toxic nerve pains which are so frequently magnified by toxemia.

We hope the profession, therefore, confronted with these gratifying results of local, general and specific treatment, will divert from the previous conception of the treatment for these patients, and animadvert to this form of therapy, which yields such relief.

SUMMARY

There are definite findings which enable urologists to diagnose early and late nerve lesions involving the bladder; and since the bladder is so frequently primarily symptomatically involved, it behooves us to appreciate these clinical features in order that many patients may have the advantage of an early reference for complete neurologic investigation, so that they may be protected against further progress of the disease, and also that we, as surgeons, may be protected against operating on an unsuspected central nervous system disease.

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# SHELL FRACTURES OF THE SPINE

## WITH OBSERVATIONS ON KIDNEY AND BLADDER FUNCTION *

H. W. PLAGGEMEYER, M.D.

DETROIT

In the preparation of this brief report of a series of seventeen cases of shell fracture of the spine as observed at the Walter Reed General Hospital, the subject was approached with a full realization of the period of time that necessarily elapsed between the inflicting of the wound and our first clinical view, connoting the transition from the primary stage of spinal shock with depression and retention to the succeeding stages usually characterized as the stages of: (1) paradoxical, or passive incontinence; (2) periodic reflex micturition, or active incontinence, and (3) paralytic or complete incontinence, in which latter phase evacuation of the urinary bladder is continuous, automatic and complete.

It was in these later stages, with their bewildering array of signs and symptoms, that the cases first came to our attention, and it is on these phases only that we feel entitled to make comment, our primary approach having been made from an entirely agnostic point of view, with no prejudices and with no deliberately acquired knowledge of what one might expect to find.

The cases had been, in every instance, referred to the department of urology from the neurosurgical section, with a diagnosis of fracture of the spine and urinary incontinence. The patients were all in the third decade, and in no case was there history of previous incontinence. The time between the inflicting of the injury and of the first observation varied from two and a half to eight months, with a mean average time of four and a half months. Every patient had been catheterized abroad, all of them were infected, and many of them demanded catheterization as their right. Needless to say, it was on this assumption only that we took the liberty of doing simple cystoscopy on the bladders examined.

All cases gave a history of complete retention following injury. The onset of incontinence varied from twenty-four hours in five cases to six months in one case, but this patient had an inlying catheter when admitted, and four others, in which the history was given as three, four, five and six weeks, respectively, had apparently been catheterized as a routine. Barring these, the mean average of onset of incontinence was forty-eight hours.

The site of the lesion varied from the sixth cervical to the cauda equina, the lumbar cord being the favored site in nine cases, the dorsal in five, the cervical in two, and the sacral in one. Several of these overlapped; thus two of the lower lumbar lesions involved the first sacral vertebra, one of the upper dorsal involved the seventh cervical, one lower dorsal included the first, second and third lumbar, and the sacral case evidently involved the emanation of the cauda equina and the conus.

Rectal involvement was general and ran a course symptomatically parallel to that of the bladder, as we should expect from the innervation and developmental analogy of their respective sphincters. Sexual desire and ability were absent in all. None of the cases showed edema while observed.

### CLINICAL FINDINGS

In eleven of the cases of this series cystoscopy was performed after consultation, every care being taken to preclude further infection, and with no untoward results. The picture was practically unvarying, and the findings might be summed up in a composite group:

1. Normal or hypertonic contraction of the external sphincter.

2. Complete relaxation of the posterior urethra, the floor definitely falling away from the roof. The verumontanum is plainly seen, in most cases appearing to lie in the floor of the bladder. The internal sphincter is almost wholly obliterated as such, though its site is marked by a slight convexity in its anteroposterior aspect.

3. The trigon in six cases was definitely atrophic in appearance, one case presenting a right lateral congestion, sharply demarcated in the midline. Four cases gave a picture of raised trigon, the elevation being especially marked at the interureteric ridge, and being rather apparent than real, owing to the bas fond lying posterior to it.

4. Generally the ureteral orifices were within range of normal, as to position, excursion and mobility.

5. Trabeculations were found in every case, gigantic in size, as a rule transverse and coarse on the floor, rather evenly distributed on the lateral walls, and having their greatest complexity on all the faces surrounding the vertex. It is probable that here the greatest local attempt at facilitation was made, as this is the site of distribution of the nervous plexus from the sacral autonomic supply—the anterior branch of

* Read before the Section on Urology at the Seventieth Annual Session of the American Medical Association, Atlantic City, N. J., June, 1919.

* Because of lack of space, this article is abbreviated in THE JOURNAL. The complete article appears in the Transactions of the Section and in the author's reprints.

the pelvic nerve. These trabeculations are strikingly coarse throughout in comparison with the lacelike, insular picture presented (according to Koll) by tabes in its incipient state, and even at times after ataxia has first supervened, as we noted in three cases of tabes with beginning ataxia examined in the course of the series.

6. There was no case of diverticulitis, and no case of trophic ulceration of the bladder.

7. Nearly all the bladders had a general vasomotor disturbance particularly marked on the floor, and chiefly characterized by irregular, ill defined areas of venous congestion. This we should expect *a priori* from the work of Gaskell, Langley and Anderson, who showed that the motor nerves of the blood vessels of the entire body, the motor nerves of the sweat glands, and the internal vesical sphincter and posterior urethral muscles, all belong to the same system. In none of these cases, however, was there evidence of hematuria, during the period of observation.

8. The level of the lesion apparently had nothing to do with either the functional activity of the bladder, or the excreting power of the kidney. The most marked evidence of neurotrophic bladder disturbance was found in Case 10, with the lesion involving the seventh cervical and the first three dorsals only. This is a typical automatic bladder of the Head type. Here the involvement was cervical; in other words, the zone of distribution of analgesia was entirely above the ninth dorsal. In this case the passage of urine and feces is not only automatic but is a completely unconscious act.

9. In none of the cases could we discover hyperhidrosis on forcible distention of the bladder; nor could we, in a single case, establish a history of hyperhidrosis, though in every case except one there was a previous history of zonal hyperhidrosis confined within the segmental limits of the thoracicolumbar outflow, and always below the segment involved.

10. Each presented residual urine in varying amounts, though there were intervals when some of them would give every evidence of true incontinence; that is, a spontaneous emptying of the bladder as soon as it had filled to a certain point. The same patients, however, would at other times, after an apparent evacuation, present as much as 250 c.c. residual. It was very evident from observing them that the summation of stimuli necessary to establish a peripheral mass reflex is a variable quantity in any given patient, or in any one of the three types of incontinence, after the incontinence has once been established. The residuals obtained varied from 0 to 810 c.c., with a mean average of 180 c.c.

### OBSERVATIONS IN FOUR SERIES

With the universal picture of residual urine present, even in those cases offering, at times, a picture of true incontinence, during which the bladder automatically emptied itself, the possibility of back pressure was considered. Retention was studied through estimation of urea nitrogen, nonprotein nitrogen, creatinin and uric acid in the blood, and excretion was determined by means of phenolsulphonephthalein, with examination of carefully collected twenty-four hour specimens of urine for urea nitrogen, sodium chlorid, uric acid and creatinin with regard to milligrams per pound of body weight. The first series showed as follows:

Controls on a 1,500 calory diet at 135 pounds averaged 12.5 mg., urea nitrogen per hundred c.c. plasma, with a nonprotein nitrogen of 38 mg. The spinal cases exhibited a range of urea nitrogen from 13.8 in the lowest, the patients at that time appearing in excellent condition and giving a two hour phenolsulphonephthalein test of 60 per cent. plus 12 per cent., to 113 mg. in the highest (nine times normal), with a bare trace of phenolsulphonephthalein, the mean average urea nitrogen being 64.6 mg., or about five times normal for the diet. Phenolsulphonephthalein tests in this series ranged from 35 per cent. to 65 per cent. for two hours, with a mean of 45 per cent., the majority of cases in this group showing a lower output in the first hour than in the second, evidencing a lack of facility on the part of the kidney to resume function.

Creatinin in the blood stood at normal throughout, averaging 1.52 mg. per hundred c.c. We desire at this point to emphasize the fact that even in the very serious cases the blood creatinin stood at normal, the highest being 2.2 mg.; this in spite of the previous wide excursions of urea nitrogen. The practical point to be borne in mind here is that by the time creatinin has registered a serious rise in its curve, the patient is critically ill, whereas the urea nitrogen curve and the excretory function have long since given the prognostic sign.

The patients were kept on practically the same food values for a month, given free access to water, and given massage of the whole body daily, especially over the region of the hypogastric and inferior mesenteric plexus, with the triple idea of adding to the general tone of the organism, stimulating peripheral mass reflexes, and expediting the vicarious compensatory activity of the skin for urea and uric acid. At the reading of the next series, one month later, the following results obtained: The blood urea was: lowest, 11.98 mg.; highest, 67.2; mean, 26.82, or only twice normal. Creatinin averaged 1.1 mg.

In this series was a case of previous left nephrectomy with suprapubic drainage. This patient was improving rapidly, had a urea nitrogen concentration of 13.8 (normal), creatinin normal, phenolsulphonephthalein test of 72 per cent., when suddenly his blood urea nitrogen shot up to 67.2, his excretory function became practically nil, and death resulted with all signs of acute pyonephrosis and uremia. Aside from this adventitious circumstance the mean average urea nitrogen would be 23.71 mg. The average phenolsulphonephthalein test for this series was 60 per cent. for two hours, the first hour averaging 37 per cent., the second 22 per cent., with a distinct tendency in all cases for the first hour to take up the bulk of function.

The third series, done one month later, showed a blood urea concentration averaging 15.10 mg. per hundred c.c. plasma, the lowest being 8.2 mg. in a patient clinically improving with a phenolsulphonephthalein test of 61 plus 28 per cent. and the highest being 32.6 mg. with a phenolsulphonephthalein test of 6 plus 9 per cent. equaling 15 per cent. The average phenolsulphonephthalein test was 48 per cent., which included two very septic patients (aside from these the average would be 57 per cent.), the average of the first hour being now appreciably increased over that of the second, except in the two patients who were still very sick.

The fourth series, done one month later, showed an average blood urea of 14.27 mg., the highest being 31.6 mg., the lowest 5.6 mg. All of the phenolsulphonephthalein tests were distinctly good as regards the relationship of the first and second hours, except in Case 10, in which the blood urea was still 31.6 per cent. and the condition was not good.

It had been suggested in noting the very high urea nitrogen retention that possibly the marked cases of trophic ulceration seen in six of the soldiers could be accounted for by urea poisoning, the necrosing effect of quinin urea hydrochlorid in wounds operated on by anociassociation being used as an analogy. This is scarcely tenable, as all the cases showed the trophic disturbance below the zone of distribution of the spinal involvement, which would not be so if the trophism were the result of a toxic agent in the blood stream. Moreover, they were all normal as to blood sugar, and to carbon dioxid tension in the blood, and the urines were persistently negative to a reducing agent, on forced carbohydrate diet.

TABLE 1.—THE MONTHLY RELATIONS BETWEEN RETENTION OF UREA NITROGEN AND EXCRETION OF PHENOLSULPHONEPHTHALEIN *

| Case | February | March | April | May |
|---|---|---|---|---|
| 1 | 23.3<br>30 + 15 | 16.8<br>45 + 30 | 10.2<br>40 + 16 | |
| 2 | 94.0<br>25 + 10 | 19.8<br>20 + 25 | 10.2<br>32 + 20 | 5.6<br>30 + 20 |
| 3 | 80.0<br>15 + 20 | 15.8<br>55 + 25 | 8.4<br>42 + 19 | |
| 4 | 56.0<br>25 + 15 | 19.0<br>30 + 15 | 8.2<br>35 + 15 | 15.3<br>42 + 18 |
| 5 | 15.4<br>30 + 20 | 26.6<br>..... | 30.0<br>5 + 15 (sick) | |
| 6 | 103.0<br>20 + 45 | Dead | | |
| 7 | 48.0<br>20 + 30 | 26.0<br>50 + 25 | 18.2<br>42 + 17 | 11.2<br>62 + 19 |
| 8 | .... | 65.0<br>50 + 35 | 12.8<br>50 + 22 | 11.18<br>48 + 12 |
| 9 | 105.0<br>Lost | 21.0<br>22 + 15 | 16.0<br>20 + 22 | 10.2<br>58 + 28 |
| 10† | 113.0<br>0 | 28.4<br>2 + 2 | 32.6<br>6 + 9 | 31.6<br>2 + 7<br>(very sick) |
| 11 | 13.8<br>60 + 12 | 67.2<br>0 | Dead | |
| 12 | .... | 24.9<br>50 + 20 | 14.0<br>42 + 19 | |
| 13 | .... | 28 9<br>20 + 15 | 24.2<br>13 + 6 | |
| 14 | 93.0<br>4 | 21.4<br>41 + 18 | 8.4<br>40 + 16 | |
| 15 | .... | 11.98<br>20 + 20 | 22.1<br>38 + 15 | |
| 16 | .... | .... | 9.32<br>42 + 16 | |
| 17 | .... | .... | 14.2<br>37 + 17 | |

* In each monthly block the upper figure represents milligrams of urea nitrogen per hundred c.c. of blood plasma, the lower figures showing the output of phenolsulphonephthalein in two periods of seventy and sixty minutes, respectively.

† Fifth reading, June 2, 1919, 25 mg. urea nitrogen per 100 c.c. blood plasma, output of phenolsulphonephthalein for seventy and sixty minutes 9 + 12; improved. No. 10 was slowly improving when the fifth reading was done. The rise in phenolsulphonephthalein as urea nitrogen decreases should be noted. This was an automatic bladder, with profound disturbance. The persistent retention of nitrogen in Case 10, even after careful daily removal of the residual, should be noted. This is probably due to renal infection, and would be a better indication of the danger of operation on the lower tract than the creatinin which remained persistently at 2 mg. per 100 c.c. plasma.

## COMMENT

We have, then, for our consideration a general picture of unusually high urea nitrogen, with high nonprotein nitrogen, and persistent normal creatinin in the blood, balanced by a comparatively low renal concentrating power for urea, with a low output of creatinin in twenty-four hours, and low uric acid output; and collaterally, a colorimetric curve rising, as a whole, where the retention curve falls.

That there is not an essentially reciprocal curve existing between urea retention and phenolsulphonephthalein excretion would seem, however, to be borne out frequently in studying individual histories, though the number in this series is certainly too small to form a basis for dogmatic statement. At one time, the phenolsulphonephthalein curve rises more rapidly than the urea curve drops, and vice versa, but the curves always crossed sooner or later, and, taken altogether, gave an astonishingly good prognostic picture of the clinical change that later supervened, even though the curve changes have not always been synchronously reciprocal. Also in the stage of high urea retention, the renal function, though it appears fairly high in the total, is much lower the first hour than the second, which is an important point in interpretation.

It was at first assumed that the retention phenomena observed were caused by back pressure leading to hydronephrosis. That this need not necessarily be true is shown in one case on which we obtained necropsy. This soldier had 103 mg. of urea nitrogen before death, and 68 mg. of nonprotein nitrogen. His phenolsulphonephthalein test was fairly high, 20 and 45 per cent., but the first hour was less than half the second, and the appearance time was twenty-one minutes (gluteal). His average residual was 135 c.c., with a relaxed bladder, and a bullet in the spine at the emanation level of the ninth, tenth and eleventh thoracic vertebrae which would certainly be expected to involve the ureters. Nevertheless, at necropsy there was found no evidence of hydro-ureters or hydronephrosis, as the specimens will show. There was evidently a distinct protective tendency seen in the local compensatory activity of the bladder, even with a spinal cord on which complete transection was diagnosed clinically in England, in which case necropsy disclosed the posterior half of the cord completely shot away.

Another case in a collateral series of nontraumatic spines showed at operation a giant-cell sarcoma involving the lower dorsal and the upper lumbar vertebrae. This case showed the same bladder picture described above, but there was no evidence of back pressure on the kidneys, the blood urea being 11.2 mg. per hundred c.c. of plasma, the nonprotein nitrogen 36.6 mg., and the creatinin 1.2 mg.

This early protective tendency may possibly be explained by the work of Elliott, who found in his decentralized bladders an overgrowth of musculature associated with an increase in the number of unstriped muscle fibers, as well as an increase in the cross section of each fiber, with an increased suppleness and irritability of the muscle itself. This increased thickness of the bladder wall was observed many times at the operating table by Thompson Walker. In the one case in our series that came to necropsy this was also demonstrated, and clinically we have noted a repeated tendency for the residual or contained urine to be greater than the capacity, showing a decided tendency

on the part of the bladder to resist suddenly injected fluid.

There must be some other ground than hydronephrosis for the retention phenomena exhibited, for otherwise the high nitrogen concentration would have been relieved by the previous catheterization.

The architectural incompetence of the kidneys to withstand long continued back pressure is recognized in the domain of prostatic obstruction; but here we are dealing with a sudden shock, with a tendency for the musculature of the lower tract to compensate quickly, and, at least for many months, to protect the higher tract. If hydronephrosis supervenes it certainly must be at a much later stage than in the cases we have observed. In addition to possible hydronephrosis I would be inclined to ascribe retention to several other factors. In the cases, as first seen, the blood urea nitrogen was inordinately high; first, because of the tremendous tissue waste resulting from neurotropism, as evidenced in the body weight and general appearance of emaciation; secondly, these patients while abroad, and in transit, lacked free access to water, in the attempt to avoid too frequent catheterization, until they were almost completely dehydrated. Consequently, with a low fluid content in the blood stream, the solid content would rise proportionately. Add to this the neurotrophic hyperhidrosis that takes place in all these cases, which would further increase the concentration, and augment this with the steady addition of tissue nitrogen, the whole being offset by a recalcitrance on the part of the kidneys to concentrate adequately for excretion, owing to infection or inhibition of neuropathic origin (as seen in the bladder), and the explanation would seem complete. Certain it is that with free access to water (which they drank copiously at first), daily massage, and attention generally to peripheral stimulation, and to the reestablishment of normal skin function, with particular attention to stimulation of peripheral areas segmentally involving the inferior mesenteric and hypogastric plexus, the picture changed markedly. The urea nitrogen and the nonprotein nitrogen decreased month by month, and the kidney excretory and concentrating capacity increased absolutely if not relatively for any given point of the curve.

It is aside from the province of this report to discuss at length the early care of these cases. I would simply suggest, if possible, entire abstention from catheterization, for catheterization means sure infection, and the replacement fibrosis following renal infection is more lasting and more dangerous to the patient than a hydronephrosis, even granting a permanent hydronephrosis to exist in these cases.

The first retention is a shock phenomenon and undoubtedly involves both sphincters, the internal sphincter playing the dominant rôle. Later on, the internal sphincter relaxes and the external sphincter takes up its compensatory hypertonic action. The problem is to evoke an automatic activity at the earliest possible moment, and resolves itself down to an inhibition of this internal sphincteric hypertonicity. This shock phenomenon is probably due to the inhibiting action of the brain. Even a decentralized bladder will functionate on reception of nocuous stimuli, after cerebral inhibition is relaxed. This, as Head has shown, is due to a peripheral mass reflex, and as these patients are all hyperesthetic, it may be effected in various ways, from stimulation of the plantar flexor spasm, to irritation of the prostatic plexus, the most direct approach, however, being anatomically by way of the hypogastric plexus. The first problem is to relax this tension by working backward from the periphery, and observations abroad by Young, Keyes, McCague, Besley, Horrax and others have proved that this method has merit.

If intervention has to be, there is surely no contraindication to the use of the aspirating needle until incontinence is established. Thompson Walker even advocates the use of suprapubic cystotomy as preferable to the continued use of the catheter. This would probably not be necessary if immediate resort were had to the use of general sedatives, with careful atten-

TABLE 2.—STATISTICAL RESULTS IN SELECTED CASES

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Catheterized Residual | | | | | Phenolsulphonephthalein | | | Blood, Mg. per 100 C.c. | | | | Urine | | | | Food Calories | |
| Case | Reg. No. | Age | Rank | Date | First Hour | Second Hour | Character of Urine | Total Amount Urine 24 Hrs., C.c. | Body Weight, Pounds | First Hour | Second Hour | Total | Urea N. | Nonprotein N. | Creatinin | Uric Acid | Urea N., Gm. per 24 Hours | Sodium Chlorid, Mg. per 100 | Creatinin, Mg. per 100 | Uric Acid, Mg. per 100 | First Day | Second Day |
| 10 | 25062 | 23 | 2d Lt. | 4/29/19 | 100 | 70 | Clear | 1,600 | 114 | 0† | 2 | 2 | 113 | 66.6 | 2.0 | 3.4 | 18.0 | 395 | 912 | 727 | 1,918 | 1,034 |
| | | | | | | | | | | 2 | 7 | 9 | 31.6 | | | | | | | | | |
| 4 | 22700 | 25 | Pvt. | 4/30/19 | 45 | 75 | Reddish alkaline | 1,150 | 110 | 25 | 15 | 40 | 56 | 46.0 | 1.5 | 0.2 | 6.1 | 432 | 340 | 400 | 1,014 | 1,289 |
| | | | | | | | | | | 42 | 18 | 60 | 15.8 | | | | | | | | | |
| 2 | 24931 | 23 | Pvt. | 5/ 1/19 | 70 | 165 | Reddish alkaline | 830 | 133 | 25 | 10 | 35 | 94 | 50.0 | 1.5 | 0.9 | 5.0 | 592 | 470 | 1,000 | 1,357 | 1,347 |
| | | | | | | | | | | 30 | 20 | 50 | 5.6‡ | | | | | | | | | |
| 9 | 25601 | 30 | 2d Lt. | 5/ 2/19 | 180 | 85 | Reddish alkaline | 1,750 | 114 | 22 | 15 | 37 | 105 | 44.0 | 1.4 | 1.9 | 10.3 | 526 | 1,130 | ... | 1,766 | 1,838 |
| | | | | | | | | | | 52 | 28 | 80 | 10.2 | | | | | | | | | |
| 8 | 25918 | 28 | Pvt. | 5/ 3/19 | 175 | 100 | Cloudy | 2,600 | 131½ | 50 | 35 | 85 | 65 | 46.0 | 1.3 | 1.4 | 11.0 | 561 | 577 | 260 | 1,142 | 1,504 |
| | | | | | | | | | | 48 | 12 | 60 | 1.18 | | | | | | | | | |
| 7 | 22719 | 27 | Pvt. | 5/ 4/19 | 275 | 115 | Reddish alkaline | 2,000 | 122 | 62 | 19 | 81 | 11.2 | 45.0 | 1.1 | 2.1 | 11.0 | 370 | 525 | 220 | 1,158 | 1,098 |
| Controls | | | | | | | | | | | | | | | | | | | | | | |
| 1 | | 23 | Pvt. | 4/28/19 | 350 voided | 50 voided | Clear | 1,200 | 140 | 40 | 14 | 54 | 12.1 | 36.6 | 1.0 | 2.0 | 11.4 | 666 | 2,172 | 852 | 1,500 | 1,500 |
| 2 | | 25 | PFC | 4/28/19 | 325 voided | 70 voided | Clear | 1,300 | 132 | 44 | 11 | 55 | 13.0 | 40.0 | 1.15 | 2.2 | 11.8 | 617 | 912 | 850 | 1,500 | 1,500 |

* At the time the report of these cases was prepared, the first three patients were in distinctly bad condition, the last three were distinctly improving. The results, as tabulated, were rather surprising, but one week after the data were obtained Cases 4 and 2 changed markedly in improvement, and are steadily progressing upward. Patient 10, with persistent high urea did not improve, as we were able to prognose from these findings.

† In Columns 9, 10, 11 and 12, the upper figures show values obtained when first seen; the lower figures show values at end of third month of observation. The phenolsulphonephthalein tests in this series were all intramuscular, either deltoid or gluteal.

‡ When the blood urea is low and the urinary urea also low, the patients are showing marked clinical improvement, and the greater the drop below normal the more marked is the picture of tissue resorption. This is specially true of Patients 2 and 9. Patients 7 and 8 have been upbuilding so long they are no longer reabsorbing into the tissues.

tion to stimulation of mass reflexes, by irritating the periphery, especially over the hypogastric plexus, with the idea of relaxing immediately the floor of the bladder and the internal sphincter. The external sphincter will relax very shortly thereafter, as the pudic nerve has been proved by repeated experiments to fatigue very rapidly after continuous stimulation.

Strange to say, these bladders do not rupture; and as they are insensate, no discomfort is experienced. The extent of their dilatation can be readily determined, and if by judicious use of extravesical stimuli the onset of incontinence can be established early without the use of the catheter, the patient is further protected from the otherwise inevitable infection, which abroad has resulted in a mortality of 50 per cent.

## REPORT OF CASES

CASE 1.—B. B., Pvt., G., 120th Inf., Reg. No. 25920, Serial No. 198164, aged 28. No previous history of incontinence. Injured, Oct. 10, 1918. Catheterized four times. Subsequent pressure over bladder to facilitate extrusion, during four weeks, followed by use of inlying catheter till Nov. 26, 1918. Onset of incontinence: Vague, Nov. 26, 1918 (?). Lesion: Third and fourth lumbar (?). Roentgenogram, C. C. S. 41.

Operation, Oct. 10, 1918. Entrance through fifth lumbar; rifle bullet removed from "center of canal," Base Hospital No. 29.

Blood urea (Walter Reed General Hospital), Feb. 7, 1919: 23.3 mg. per hundred c.c. plasma, urea nitrogen; Feb. 10, 1919: 16.8 mg.; March 25, 1919: 20.0 mg.; April 18, 1919: 10.2 mg. Creatinin in blood, March 25, 1919: 2.22 mg. per hundred c.c.; April 18, 1919: 1.2 mg. Phenolsulphonephthalein output, Feb. 18, 1919: 30 per cent. first seventy minutes plus 15 per cent. next sixty minutes, total 45 per cent.; March 26, 1919: 45 per cent. first seventy minutes plus 30 per cent. next sixty minutes, total 75 per cent.; April 18, 1919: 38 per cent. first seventy minutes plus 29 per cent. next sixty minutes, total 67 per cent. Hemoglobin, March 1, 1919: 70 per cent. Blood count, March 25, 1919: leukocytes, 11,200; March 21, 1919: leukocytes, 12,350; erythrocytes, 3,261,000.

Cystoscopy, Feb. 8, 1919: Residual urine, 200 c.c.; capacity, 420 c.c. Sensation on pressure present; expulsive force with cystoscope in situ, good. Internal sphincter relaxed completely, posterior urethra practically part of floor of bladder, with verumontanum plainly seen with Brown-Buerger simple examining cystoscope; trigon atrophied; interureteric ridge not seen as such. Left ureteral orifice rather wide and gaping, right not seen. Fine trabeculations on the lateral walls; none on the floor.

Residual urine, Feb. 8, 1919: 200 c.c., cloudy, full of pus and colon organisms; March 1, 1919: 150 c.c.; March 3, 1919: 375 c.c.; April 8, 1919: 530 c.c., heavy sediment of pus; April 19, 1919: 370 c.c., slightly cloudy with pus.

Trophic ulcers: Right heel, small size, present, Feb. 8, 1919.

Urine: Albumin trace; pus ++; casts negative; B. P. 135-110. Rectal involvement: Yes. Sexual powers: Absent; sexual desire absent. Hyperhidrosis: Extensive areas involved at times, notably for three days, about March 13, 1919. No relation to fulness of bladder.

Clinical course: Generally good; improving slowly.

Neurologic findings: Motor: This is a root lesion, not a cord lesion—extending from cauda up to and including first lumbar. Left penis, left scrotum dead to tactile sense. Right perineal touch partially gone on right, all gone on left, showing conus involvement. Plantars, Achilles and patellars all lacking. Diagnosis: Root lesion including conus up to first lumbar inclusive on left side.

Comment: This soldier was first seen four months after injury, at which time he had a definite paradoxical incontinence, with poor rectal control. There is no control of bladder, and practically no sensation, even on forced distention. Would come under the general head of automatic bladder. The difference in residual urine at various times should be noted, evidently due to irregular action of mass reflexes of which the patient is not aware at the time. The blood urea dropped from 23.3 mg. to 10.2 mg. in two months on the same diet, during which time phenolsulphonephthalein rose from 45 to 75 per cent., creatinin remaining normal.

CASE 2.—R. S., Cpl., E., 48th Inf., Reg. No. 24931. Serial No. 2260123, aged 22. Injured, Oct. 31, 1918. Machine gun bullet, 32 caliber, still in spine. Previous history: incontinence negative. Paralysis of both legs at once. Tingling and burning in feet and legs ever since. Catheterized: For five weeks after injury, since which time has "emptied" freely and without control. Incontinence (?).

Lesion: Bullet at level eleventh dorsal; roentgenogram, Walter Reed General Hospital, Jan. 14, 1919.

Blood urea nitrogen, Feb. 4, 1919: 94.0 mg. per hundred c.c. plasma; March 25, 1919: 19.5 mg.; April 19, 1919: 10.2 mg. Blood creatinin, March 25, 1919: 1.66 mg. per hundred c.c. plasma; April 19, 1919: 0.90 mg. Glucose, May 15, 1919: 0.14 per cent.; carbon dioxid tension, 65 per cent. Renal function, Feb. 18, 1919: 25 per cent. plus 10 per cent. total, 35 per cent., two hours and ten minutes; March 26, 1919: 20 per cent. plus 25 per cent., total, 45 per cent., two hours and ten minutes; April 19, 1919: 34 per cent. plus 10 per cent., total, 44 per cent., two hours and ten minutes.

Blood pressure, April 19, 1919: 110—65, Tycos auscultatory test. Hemoglobin, March 3, 1919: 60 per cent. Blood count, Jan. 24, 1919: Whites, 4,800; March 3, 1919: Whites, 14,200.

Cystoscopy: Contraindicated.

Residual urine, Feb. 18, 1919: 160 c.c., cloudy; March 1, 1919: 90 c.c., cloudy; April 19, 1919: 100 c.c., cloudy.

Trophic ulcers: Right hip, right crest; left hip, left crest; right and left heels, sacrum; right and left knees, mesially; all severe; the areas over both anterior superior spines being 20 by 10 cm.

Urine: Yellow, turbid, alkaline, 1.018, albumin +++, much mucus, no blood or casts. Triple phosphate crystals, and large amount of amorphous phosphates. Rectal involvement: Yes; no sensation; diarrhea. Sexual powers: Absent. Bladder: Urine collects in bladder for an hour or more, then passes without sensation of fulness and without awareness by the patient. No sensation on forced distention, nor any change in sensation on emptying. Hyperhidrosis: Continuous sweating, body and upper extremities; onset about Feb. 1, 1919. Five to six changes of pajamas nightly until recently. Examination, April 22, 1919, 9 p. m.: Moist over whole back, chest and abdomen; legs and feet dry. No relation to fulness of bladder according to statement.

Clinical course: Very sick patient.

Comment: This is paradoxical incontinence, but it is also a case of automatic bladder. Rising blood count is probably due to infection from trophic ulcers, which grew steadily worse in spite of all care. Phenolsulphonephthalein output slowly rising as urea decreases. The third series of functions (44 per cent.) is decidedly better than the second (45 per cent.) because of the relative values in the first and second hours. Creatinin remains normal throughout up to April 9, 1919. Patient slightly improving.

CASE 3.—J. H., Cpl., D., 362d Inf., Reg. No. 24408, Serial No. 2260123, aged 31. Previous history of incontinence negative. Injured, Sept. 26, 1918, Argonne. Catheterized three or four times after wound. Incontinence began in two days. Unconscious after injury.

Lesion: Single plates, Jan. 7, 1919, reveal no bony changes. Bullet wound on back to right of eighth dorsal. Roentgenogram, Feb. 1, 1919: hypertrophic osseous changes of fifth lumbar (old injury). Gunshot wound, third dorsal.

Blood urea nitrogen, Feb. 4, 1919: 80.0 mg. per hundred c.c. plasma; March 25, 1919: 15.8 mg.; April 23, 1919: 8.4 mg. Glucose: May 15, 1919: 0.17 per cent.; carbon dioxid tension, 51 per cent. Blood creatinin, March 25, 1919: 1.63 mg. per hundred c.c. plasma. Renal function, Feb. 18, 1919: 15 per cent. plus 20 per cent.; totals, 35 per cent, two hours and ten minutes; March 26, 1919: 55 per cent. plus 25 per cent.; totals, 80 per cent., two hours and ten minutes; April 23, 1919: Not done on account of refusal of patient; hyperirritability. Hemoglobin, March 3, 1919: 60 per cent. Blood pressure, March 26, 1919: 112—65, Tycos auscultatory test. Blood count: Whites, 7,800.

Cystoscopy: Contraindicated. Residual urine, Feb. 18, 1919: 210 c.c.; March 1, 1919, 60 c.c. Trophic ulcers: Back, left hip, both heels.

Urine, Feb. 24, 1919: Acid, 1.028; albumin ++; triple phosphate crystals. Rectal involvement: Slight control of rectum, for two or three minutes if stool is hard, but sphincter quickly fatigues. Bladder: Was catheterized four times to his knowledge. Unconscious for unknown period of time after injury, does not know how many times he was catheterized in hiatus. Slight control: calls for urinal. Sexual power: Desire absent; no erections. Hyperhidrosis: Denies sweating up to April 22, 1919. No sweating on fulness of bladder.

Clinical progress: Very poor, May 1, 1919. Urine: Albumin trace, pus ++; no casts. Blood pressure: 140—110, Tycos auscultatory test.

Comment: This is a case of hyperirritability, with general hyperesthesia. In this type of case, when the peripheral involvement has an equal or greater signature than the central involvement, there is no sweating. Also this type has local registration of bladder and bowel distention reflex, and does not present cases of true incontinence. The rise in phenolsulphonephthalein both as to total and also as to hourly relationship compared with fall in urea nitrogen should be noted.

Case 6.—R. O., Pvt., E., 9th Inf., Serial No. 293922, aged 29. Previous history of incontinence negative. Injured, Sept. 14, 1918: Struck with shrapnel right hip, and almost immediately thereafter with rifle ball which entered about tenth dorsal. Catheterization: None, according to statement (?). Onset of incontinence: Two days from time of injury—constant dribbling. Lesion: Seventh, eighth and ninth spinal vertebrae.

Operation, Evacuation Hospital No. 1, Sept. 14, 1918: Diagnosis, gunshot wound, battle, penetrating lumbar region, posteriorly severing spinal cord. Wound debrided and closed.

Blood urea nitrogen, Feb. 4, 1919: 103 mg. per hundred c.c. plasma. Renal function, Feb. 18, 1919: 20 per cent. plus 45 per cent.; total, 65 per cent.

Cystoscopy: Not done; patient died, Feb. 28, 1919. Residual urine, Feb. 18, 1919: 135 c.c., cloudy; Jan. 5, 1919: Alkaline, specific gravity 1.012, albumin trace, sugar and acetone negative, occasional red cell, no casts, many pus cells. Blood count, Jan. 3, 1919: White blood count, 10,000.

Trophic ulcers, report from Base Hospital No. 26, Sept. 20, 1918: Both feet, legs, left hip and buttocks. Base Hospital No. 8, Oct. 23, 1918: Large suppurating wound on back, iliosacral and gluteal regions; gangrenous. Deep suppurating ulcers, right hip. Rectal involvement: Yes; involuntary and without knowledge of patient. Bladder: Report from Base Hospital No. 26, Sept. 20, 1918, says there was retention of urine; catheterized twice daily; this was evidently for residual, and not complete retention. Sexual power: Desire and ability absent since injury. Hyperhidrosis: No history.

Clinical course: Terminated fatally, Feb. 28, 1919; diagnosis, asthenia.

Comment: In this case there was an involvement of the thoracic spine with embedding of bullet as demonstrated at necropsy in the very level where one would expect involvement of the ureters with dilatation and secondary hydropyonephrosis from regurgitant ureteritis. Also from the history obtained from Base Hospital No. 26 it would seem that at one time there must have been considerable back pressure. He had a blood urea of 103 mg. per hundred c.c., but his phenolsulphonephthalein within ten days of death was 65 per cent. for two hours and ten minutes, with an appearance time of twenty-one minutes, pointing to a parenchymatous type of involvement. The bladder is mildly typical of the kind we are describing, with dilatation of the posterior urethra, universal trabeculation, etc., and yet there was no evidence of hydro-ureter, and no sign of hydronephrosis, or of pyonephrosis present, even with a practical transection myelitis at the region of the ninth dorsal. This proves that high blood urea, at least, does not necessarily prove hydronephrosis, and that retention, with involvement of the lower thoracic spine is not necesarily accompanied by hydro-ureter and hydronephrosis. Possibly if this case had gone on a hydronephrosis might later have resulted, but even at this stage the patient had all the clinical findings assumed to lead to this condition, with negative necropsy.

Case 10.—McI., L.; 1st Lieut., K., 309th Inf., Reg. No. 25062, Serial No. 1173172, aged 27. Previous history of incontinence negative. Injured, July 18, 1918. Catheterization: None. Onset of incontinence: At once. Lesion: Seventh cervical and first to fourth dorsal.

Operation, Oct. 19, 1918.

Blood urea nitrogen, Feb. 4, 1919: 113 mg. per hundred c.c. plasma; March 25, 1919: 28.4 mg.; April 24, 1919: 32.6 mg. Blood glucose, May 15, 1919: 0.14 per cent.; carbon dioxid tension, 57.9 per cent. Creatinin, March 25, 1919: 2.0 mg. per hundred c.c. plasma; April 24, 1919: 2.0 mg.

Renal function, March 25: 3 per cent.; two hours and ten minutes; April 24: 6 per cent. plus 9 per cent.; total, 15 per cent. Blood pressure, April 24: 165—110, Tycos auscultatory test. Residual, Jan. 27, 1919: 375 c.c.; April 24: 175 c.c.

Cystoscopy, Jan. 27, 1919: Residual, 375 c.c. After this is withdrawn, bladder resists forcibly at 225 c.c. distention. Much washing necessary, to clear bladder of detritus and pus. Mild catarrhal cystitis throughout. Pain sense lacking in bladder on distention, but can tell the difference between hot and cold water injected. Beginning diverticulum on floor midline 1 cm. behind interureteric ridge. Cathedral vaulting throughout. Trigon slightly congested in center. Roof particularly trabeculated. Prostatic outline in range of normal. No relaxation of posterior urethra.

Bladder: Emptied by pressure over lower abdomen for first three weeks after injury; then up to Feb. 1, 1919, dribbled a few drops at a time without knowledge of patient. Since being cystoscoped and washed at Walter Reed Hospital, he has sensation and desire to urinate at times, evidently verumontanal irritation is increased; has, May 1, 1919, ability to hold water three or four minutes after desire to empty is manifest. Rectum: Did not know when bowels were moving until Oct. 1, 1918. Since that time gradually returning sensation in rectum and awareness of desire to defecate. Sexual powers, May 1, 1919, desire and ability returning slowly.

Trophic ulcers: One size of half dollar on sacrum. Hemoglobins, Feb. 3, 1919: 60 per cent.; white blood count, 16,900; March 3, 1919: 55 per cent.; white blood count, 14,600; March 21, 1919: 70 per cent.; white blood count, 12,350; reds, 3,216,000; March 25, 1919: White blood count, 11,500 (Polymorphonuclears, 75 per cent.).

Hyperhidrosis: Onset, Feb. 1, 1919; genuine chills with sweating. During the month of February he ran a septic chart and high leukocyte count. This may have been from absorption from the ulcer. As this healed, the general picture of sepsis subsided. Urine: Albumin, plus +++; no casts. Blood pressure: 165—110.

Clinical progress: Poor.

Comment: His renal function did rise, it is true, concomitantly with the fall in urea nitrogen in the blood, but the general picture in this case is bad. His hyperhidrosis is not typical and is due undoubtedly to sepsis, but this, on the other hand, is not a typical retention case of the worst type. The lesion is so high that the area of hyperhidrosis is vast, and it is possible that fluid emanation by the skin may have been imperceptible, and still compensated for the mild retention left over from the almost constant dribbling. The patient has, however, an automatic bladder of the Head type.

## ABSTRACT OF DISCUSSION

### ON PAPERS OF DRS. CAULK, GREDITZER AND BARNES, AND PLAGGEMEYER

Dr. Budd C. Corbus, Chicago: Dr. Caulk presented a very interesting condition of the bladder as a result of syphilis. But this condition is only an incident in the general infection; I think, as far as general management goes, especially in relation to a cure, these findings come rather late for the benefit of the patient. The time to diagnose and treat syphilis of the bladder is long before it reaches the stage that the

picture described represents. Ogilvie said that if cerebrospinal syphilis is recognized long before the interstitial tissue or its coverings are involved, its treatment and cure is a possibility. Recently there has been formed in the state of New York a society whose sole aim is the early recognition of involvement of the central nervous system. There seems to be some confusion in regard to the blood Wassermann. A blood Wassermann has nothing to do with the spinal fluid, as 65 per cent. of all tabetics have negative blood Wassermanns, and positive spinal fluid Wassermanns. What are we going to do when we get a case of tabes? Is it our problem to make a diagnosis by cystoscopy? I do not think so. A recent speaker emphasized emphatically the dangers of infecting the urinary bladder in conditions where there is a paralysis due to fracture of the vertebrae. In syphilitic bladders we have practically the same condition. We have an injury to the cord and its coverings, and it seems to me just as unpractical to attempt to catheterize in these cases as it would be in the case where the paralysis was due to a direct traumatism. It is easy to do a spinal puncture and it is nearly absolutely diagnostic, being positive in about 98 per cent.; the bladder in cerebrospinal syphilis is paralyzed, and you are not going to improve that condition by daily prostatic massage, irrigations, or what not. The thing to do is to treat the condition per se, long before it gets to the paralytic stage.

DR. ABRAHAM L. WOLBARST, New York: One point in Dr. Caulk's paper that appealed to me very strongly is the possibility of differentiating between a nerve lesion and prostatic hypertrophy. In the former I have observed that a man may have a great deal of residual urine one day and none whatever the next day. I have never been able to explain it, but I have seen it a number of times. I have under observation now a case of tumor of the lower spinal cord, which illustrates this point; some days I can withdraw from 500 to 800 c.c. of foul smelling urine, and a few days later there will be no more than a few drams of residuum. Nevertheless, the patient has incontinence all the time. In prostatic hypertrophy the residuum is constant. It is well to remember this difference. As regards trabeculations in early tabes, I do not think Dr. Caulk intended to convey the impression that he would look into the bladder in order to make a diagnosis of syphilis. Many of these cases come to us solely with urinary symptoms, and when we find these trabeculations, we are at once brought face to face with an unsuspected case of syphilis. This is a very important fact to remember, for it will help us out of many difficult situations if we bear it in mind. Within the past few weeks I saw a man who had been treated for cystitis for nine months without relief. When I cystoscoped him, I found the typical tabetic bladder. This led to further examination, and the man was found to have a well-advanced case of tabes.

DR. FRANCIS R. HAGNER, Washington, D. C.: Nine months ago a man was sent to me with supposed prostatic obstruction. This man had complete obstruction for almost a year and had been catheterizing himself. A slight paralysis of one leg was present and there was some loss of reflexes on that side. On rectal examination a definite diagnosis of cancer of the prostate could be made. It was a typical, hard, infiltrated prostate, with extension along the urethra and upper edge of the prostate. On cystoscopic examination there was absolutely no evidence of obstruction at all. This man had fine trabeculations of the bladder, and had the typical picture seen in tabes. The roentgen ray showed a mass in the third or fourth dorsal vertebra, involving two vertebrae. The carcinomatous infiltration could be seen distinctly. The patient died two or three months after I saw him, the paralysis of both legs being complete. This is the first case of the kind I have seen and I think it was rather unusual.

DR. V. D. LESPINASSE, Chicago: Last year I made a diagnosis of the nerve lesion through examination of the bladder. This patient complained one day that he had trouble urinating and that he could not see very well. He entered a hospital. They examined him as regards his vision, and found it normal. He was then referred to me. I examined his bladder, and found the typic picture of a nervous bladder and referred him to the neurologist. There were no other complaints at that time that would have given an indication for a neurologic examination. The next day he began to complain of headache, and he went on and finally died of a complicated involvement of the meninges of the brain and cord. The neurologists got into quite a discussion as to just what the lesion was, but the patient died. From this experience one can see that this picture of nervous bladder is of value as a diagnostic picture, and when it is interpreted properly I think it will lead occasionally to early diagnoses of nerve lesions that otherwise would not be made till later.

DR. HUGH H. YOUNG, Baltimore: Dr. Plaggemeyer has made the first very comprehensive study from all standpoints of those very remarkable bladder conditions following wounds of war. It was a subject in which we were greatly interested in France, because, as we made our preliminary studies with the French and with the British, we saw them reporting high mortalities as the result of renal infections from all spinal lesions. Thompson Walker, for instance, was reporting anywhere from 60 to 80 per cent. of deaths as the result of infection of the spinal cord from the urinary tract. It was recognized that infection carried off those patients. In the French army it had been made a rule that all these patients had to have a suprapubic cystotomy done on them promptly. This was also done in the British army without waiting to catheterize. That was often done in the advance surgical stations. Besley for years had been treating these cases by a nonoperative treatment, allowing the bladder to distend until finally it would overflow, the residual urine would gradually decrease until the condition was not at all dangerous. Many of those patients would go on for years without any infection of the bladder or kidneys, and although they might have incontinence, the incontinence was no worse than a suprapubic drain, which was often more difficult to manage. The Canadians had adopted that method and were using it in several of their advance hospitals. A few British and French surgeons were also using the same method. The result was that in the manual of military urology we laid down the rule that if possible in all surgical formations, men with wounds or injuries of the spine, associated with complete retention of urine, were not to be operated on and not to be catheterized, but simply allowed to distend, watched carefully, with the hope that most of them would have involuntary incontinence and would get along without any great difficulty. When the time comes that we can get all these cases together we will find that our results, so far as the element of fatalities is concerned, will be very much better than was the case in the earlier times. There are certain cases in which the beginning of that incontinence was very difficult. In those cases massage of the abdomen, of the prostate, rectal irrigations, irrigations by urethra, and stimulation of various sorts were induced, and in some cases it did hasten the beginning of the incontinence. As Dr. Plaggemeyer pointed out in those cases of dilated internal sphincter, the trabeculations which developed were really due to extreme efforts of the bladder to empty itself. But the main thing brought out was the fact that the bladders could distend very greatly, without rupturing, and with eventual diminution in size, and in some cases restoration of normal urination. The important point brought out by Dr. Plaggemeyer was the remarkable ability of the body to take care of the great retention of urine.

DR. WILLIAM E. LOWER, Cleveland: In many of these patients that have been operated on for all sorts of things, the real seat of the trouble was entirely missed. This work is epoch making. It will put cystotomy on its proper basis as a means of diagnosis in these cases. Cystotomy will probably come to be the very best method for early recognition of the beginning of spinal cord lesions.

DR. JOHN R. CAULK, St. Louis: I thought I had made it clear in the paper, that we were not endeavoring to diagnose syphilis by means of the cystoscope. But the fact that we have so frequently observed this orifice with the cystoscope in individuals who had been treated for all sorts of diseases without improvement and who had negative neurologic find-

ings, and from this observation had a Wassermann made which proved to be positive, made me suggest that in such instances recognition of this picture is extremely important. Furthermore, since such a large number of these individuals consult the urologist first it behooves him to be acquainted with this picture. I endeavored to impress you with the fact that we have not sufficiently directed our attention to this phase of urology, as a complete absence of any mention of it in the textbooks will testify. As far as the treatment goes, there is quite a decided difference in the handling of an acute bladder from trauma and the bladder of the old progressive tabetic, or some other chronic central nervous system disease. I said in the paper that the automatic bladder would develop, and this type of case did not need systematic catheterization. But for the old tabetic, whose symptoms are in such great measure magnified by absorption and uremia, catheter drainage offers as much benefit as in any other type of urinary obstruction; he improves as well as the prostatic, not in every instance, but in the great majority. So then, we have a picture we must all recognize in order to protect both our patients and ourselves.

Dr. Harry W. Plaggemeyer, Detroit: I wish to reiterate almost word for word what Dr. Caulk said. Our two studies, done individually and, of course, without any knowledge of what the other was doing, represent almost identical points on the subject. In addition he has been studying a chronic, or at least, a subacute condition, and I have been studying acute shock. These bladders had a very different type of trabeculation from the type we have been discussing previously, which simply corroborates what he says, that close observation will aid us in differentiating the underlying causes.

In the bladders that we have studied there is a very apparent attempt to compensate. Cross section of the muscle of the bladders we have been studying shows the diameter increased about five times over the normal. I dare say that in the type Dr. Caulk has been studying we would find that the individual muscle fiber is atrophied. But here we are studying what is termed a torpid bladder in England. I think that word is a misnomer. Here we have an increased suppleness or reaction to the electric current, and there is a distinct local attempt, irrespective of the integrity of the spinal cord, to facilitate the reflex through what are termed peripheral masses. Sheridan showed, on his dysanuriaized bladders in dogs, that the ones that were not catheterized were not infected. But Golds had shown in 1906 that every one of his cases that were catheterized were infected. These bladders attempt to compensate for this sudden shock. As far as I can determine hydronephrosis is not an early sequel, consequently we have to do catheterization, with inevitable infection, inevitable insult to the kidney and replacement tissue in the kidney. Why do that to an already nephrotrophic organism which is struggling for life?

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**Epidemics of Poliomyelitis.**—The first great epidemic of infantile paralysis of modern times occurred in Norway and Sweden in 1905, 2,000 cases being reported in Norway and Sweden together. In 1907 the first great American epidemic occurred, 2,500 cases being reported in and about New York (this is the largest epidemic on record); about 2,900 cases were reported that year. Infantile paralysis first appeared in the United States to any considerable extent in 1894, when Caverly of Rutland reported 132 cases in the Otter Creek Valley, Vermont. In 1908 the disease was apparently quiescent, only 392 cases being reported in the United States. In 1909 there were outbreaks in various parts of the country and in Cuba for the first time, with a total for the year of 2,343 cases in all. In 1910 the disease assumed much more serious proportions. It was present in forty-three states. Several states had epidemics, 500 or more cases occurring in the District of Columbia, Iowa, Massachusetts, Minnesota, Indiana and Pennsylvania, and from 200 to 500 in Kansas, Maryland, New Hampshire, New York, Rhode Island, Virginia, Washington and Wisconsin.—Infantile Paralysis in Massachusetts During 1919, Report by Massachusetts State Board of Health.

# THE ACTIVITY OF AMERICAN DIGITALIS *

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Before the world war the greater part of the digitalis used in this country came from Germany and Austria. Some digitalis was imported from England; but, in the vicinity of Boston at least, the preference for the high grade German leaf in the three or four years before the war was so pronounced that the use of selected English leaf, previously held in high favor, greatly diminished. Biologic tests made in this laboratory in 1909[1] showed that the best German digitalis on sale in Boston was of greater activity than the best English digitalis obtainable here.

Our attention was directed to the possibility of using American digitalis as early as 1910, when a tincture of digitalis made from leaf grown in the Rocky Mountains was found by Wesselhoeft, working in this laboratory, to be nearly twice as strong as the tincture in use at that time in the Massachusetts General Hospital. This tincture from American digitalis was prepared by E. R. Squibb & Sons in January, 1909; and as it was not tested until December, 1910, it was nearly two years old and had probably lost some of its original potency.

Duffield,[2] as early as 1868, had made tests of American grown digitalis, prepared by the Shakers of Mount Lebanon, and had found, by crude chemical methods, that the percentage of active principles was higher than in samples of English leaf, and these in turn higher than in German leaves that he examined at the same time. "I am compelled," he says, "to claim for our own home-grown digitalis, if rightly dried and gathered, superiority instead of inferiority." His work seems to have led no one to study and report the therapeutic value of American digitalis leaf.

For many years American leaf was unused. In spite of the shortage in the supply of digitalis caused by the war, several unsuccessful attempts were made to obtain American digitalis from wholesale drug houses as late as 1916. It should be mentioned, however, that for a number of years the H. K. Mulford Company has grown in their drug garden at Glenolden, Pa., the digitalis used by them.

Hale,[3] in 1911, published assays which showed that first year leaves from American digitalis grown at Arlington, Va., Madison, Wis., and Seattle, Wash., were stronger than the select English leaves that he tested at the same time for comparison. Second year leaves grown in Seattle were somewhat weaker than the English digitalis.

We retested leaf put up by Caesar & Loretz which, when examined in Germany, had a value of $V = 5$. This value is approximately equal to fifty frog units per gram, but it was found in our assay to contain only twenty-four units measured by Gottlieb's scale. As the leaf had been carefully dried and preserved in a tightly corked bottle, deterioration of the leaf probably does not explain this difference. As no digitalis leaf in our series tested at that time contained more than twenty-four units, and as Gottlieb found that

* From the Laboratory of Medicine, Medical School of Harvard University.

1. Pratt: Boston M. & S. J. **163**: 279, 1910.
2. Duffield: Am. J. Pharm. **41**: 55, 1869.
3. Hale: Bull. 74, Hyg. Lab., U. S. P. H. S., 1911, p. 27.

good leaf contained fifty or more units, the most plausible explanation of our lower values is that *Rana temporaria*, used by European investigators is killed by smaller doses than the common American grass frog, *Rana pipiens*, which was used in our tests. We have found that *Rana viridens* is more susceptible to digitalis than *Rana pipiens*. Apparent variation in toxicity due to different species of frog used in England and America is worthy of more attention than it has received. If we are correct in our belief that *Rana temporaria* is killed by a smaller amount of digitalis than *Rana pipiens*, then leaf tested in England and found to be equal to the standard of 0.006 c.c. of tincture per gram frog weight of the American Pharmacopeia would actually be considerably below this standard when tested on the American frog, *Rana pipiens*.

TABLE 1.—RESULTS OF A TEST OF SAMPLES OF AMERICAN GROWN DIGITALIS

| | Description of Sample | Lethal Dose of Sample Tinctures in C.c. per Gram Frog Weight |
|---|---|---|
| 1. | Oregon, wild, 1916 | 0.004 |
| 2. | Oregon | 0.004 |
| 3. | Oregon | 0.004 |
| 4. | Oregon | 0.003 |
| 5. | Washington, wild, 1916 | 0.011 |
| 6. | Washington, cultivated, 1916 | 0.007 |
| 7. | Wisconsin, cultivated, 1914 | 0.003 |
| 8. | Ohio, cultivated, 1914 | 0.006 |

Rowntree and Macht,[4] using the cat method of Hatcher and Brody,[5] found that digitalis from the drug garden of the University of Wisconsin was more active than any of four lots of Allen's English leaves tested, and far stronger than an old stock of German leaf. One of us (J. H. P.) obtained some of this same lot of Wisconsin digitalis from Dr. Rowntree at the Johns Hopkins Hospital. A 10 per cent. infusion was prepared. The minimum lethal dose of this was 0.012 c.c. per gram frog weight. This was stronger than the majority of English and German leaves examined in this laboratory.

Roth[6] tested samples of American-grown digitalis with the results shown in Table 1.

Out of these eight samples, six fulfilled the requirements of the Pharmacopeia. Two of these were twice the standard strength, and all the specimens of wild Oregon leaf were above the standard. The first six samples were air-dried. The method of drying the last two samples was not known. Roth concluded "that the wild digitalis which is found in the Northwestern States may be utilized as a source of supply for making the various preparations of digitalis and that by using ordinary methods in handling and preparing the leaves we may secure a highly active product, which compares favorably with the activity of cultivated leaves grown under more favorable conditions."

### METHOD OF TESTING

The one-hour frog method recommended by the Pharmacopeia was used in our work. The comparative tests were all made at a temperature of 20 C. The frogs were brought into the laboratory from the storage tank at least several hours before they were used, and placed in a small tank, the water in which was kept at about 20 C. After the injection had been made, each frog was put in a jar containing a little water, and this jar was placed in a large pan partly filled with water, the temperature of which was maintained at 20 C. The temperature of the air of the room was noted and recorded. It usually ranged from 18 to 21 C. Healthy frogs of medium size were selected. They were weighed immediately before the injections were made. Few weighed less than 20 or more than 35 gm. The injections were made into the ventral lymph sac. A 1 c.c. syringe graduated into hundredths of a cubic centimeter was used. The needle was inserted through the skin of the thigh just below the groin and passed upward into the lymph sac. Incomplete absorption was found to be the most frequent source of error in the assays. Careful scrutiny should be made for unabsorbed fluid after the lymph sac has been opened up at the end of the hour. The degree of absorption was noted in the protocols. If more than one or two drops were found, the test, if negative, was repeated with the same dose.

As a control, the dose of strophanthin necessary to produce systolic standstill was determined for each lot of frogs at 20 C. This varied from 0.0000004 gm. to 0.0000015 gm. per gram frog weight. Usually from eight to ten frogs were used in testing a single sample of digitalis. In one series twenty-two frogs were required to determine with sufficient accuracy the minimal dose required to produce systolic standstill. The temperature of the water in which the frogs are kept before and during the experiment was carefully regulated, and the temperature of the air in the room was noted and recorded.

TABLE 2.—ASSAYS OF TINCTURES: MINIMAL DOSE OF TINCTURES REQUIRED TO PRODUCE SYSTOLIC STANDSTILL OF VENTRICLE

| Sample No. | Source and Description of Sample | Minimal Dose in C.c. per Gram Frog Weight |
|---|---|---|
| 1 | Washington (Hobart) first year leaf, 1916 crop, wild | 0.003 |
| 2 | Virginia (Balleston), 1916 crop | 0.003 |
| 3 | Wisconsin (Madison), university drug farm, 1916 | 0.004 |
| 4 | Minnesota (Minneapolis), 1915 crop, university drug farm | 0.005 |
| 5 | Nebraska (Lincoln), university drug farm | 0.005 |
| 6 | Virginia (Marion), 1918 | 0.005 |
| 7 | Virginia (Arlington), Bureau of Plant Industry | 0.006 |
| 8 | Indiana (Greenfield), Oregon seed | 0.006 |
| 9 | Maine (Portland) | 0.007 |
| 10 | Nebraska (Lincoln), 1915 crop, first year | 0.007 |
| 11 | Minnesota (Minneapolis), university drug farm, 1916 crop | 0.007 |
| 12 | Virginia (Balleston), 1917 | 0.007 |
| 13 | Washington (Hobart), second year leaf, 1916 crop, wild | 0.008 |
| 14 | "Rocky Mountain," E. R. Squibb & Sons | 0.008 |
| 15 | Pennsylvania (Glen Olden), "Digitol" | 0.008 |
| 16 | Nebraska (Lincoln), university drug garden, 1916 crop | 0.008 |
| 17 | Washington, obtained from the Dept. of Agriculture | 0.010 |
| 18 | Oregon (Linton), wild, May 1917 | 0.010 |
| 19 | Oregon (Linton), wild, June 1917 | 0.010 |
| 20 | Massachusetts (Andover) | 0.011 |
| 21 | Washington, 1917 | 0.011 |
| 22 | Oregon, wild, 1918 | 0.011 |
| 23 | Washington (Seattle), Sample A | 0.014 |
| 24 | Oregon (Linton), cultivated, July 1917 | 0.014 |
| 25 | Washington (Seattle), Sample B | 0.016 |

We have tested in all twenty-eight samples of American grown digitalis. Tinctures of twenty-five of these were prepared and assayed. Freshly made 10 per cent. infusions were used in testing the other three specimens. In obtaining digitalis from various sources we were aided by Dr. C. L. Alsberg, chief of the Bureau of Chemistry, Department of Agriculture, Washington, D. C. A summary of the assays of tinctures is given in Table 2.

All the tinctures were tested soon after they were made, except the "Rocky Mountain" tincture, which was nearly two years old when first assayed. Only

4. Rowntree, L. G., and Macht, D. I.: The Standardization of Digitalis and the Potency of American Grown Digitalis, J. A. M. A. **66**: 870 (March 18) 1916.
5. Hatcher and Brody: Am. J. Pharm. **82**: 36, 1910.
6. Roth, G. B.: Pub. Health Rep. **32**: 377 (March 9) 1917.

eight of the twenty-five, or 32 per cent. of the samples of digitalis, yielded tinctures that equaled the standard set by the United States Pharmacopeia IX.[7] With one or two exceptions they had been carefully collected and dried. Most of the cultivated samples had been grown in drug gardens. The series is large enough and representative enough to justify the conclusion that most of the digitalis grown in the United States is below the pharmacopeial standard. As we have shown earlier in the paper, this is true of most of the digitalis imported from England and Germany. The standard set by the Pharmacopeia is a high one. Clinical investigations in the future may show that it is unnecessarily high.

Six samples of American digitalis were stronger than the standard, and two of these were twice the strength required. One of these was from wild first year plants from the state of Washington and the other from cultivated plants grown on a commercial drug farm in Virginia. The former was assayed in February and the latter in April. These two lots were stronger than any imported digitalis tested in this laboratory. They were more active than the samples of American digitalis assayed by Hale.[3] Roth[6] reported assays on one sample of wild Oregon digitalis and one of cultivated Wisconsin leaf that equaled them in strength.

From Prof. Edward Kremers of the University of Wisconsin we obtained digitalis grown on the university drug farm at Madison that was of very high activity, and from Prof. Edwin L. Newcomb we secured cultivated digitalis from the drug farm of the University of Minnesota that was of nearly equal strength. The slight difference of 1 mg. in the minimal dose required to stop the heart in systole might be due to errors inherent in the method of assay, especially as the tests were not made on the same lot of frogs. Samples of digitalis from the drug farm of the University of Nebraska, and from Marion, Va., crop of 1918, were also found to be more active than the Pharmacopeia requires. The lot of digitalis from Virginia was secured from a Boston pharmacist who obtained it from a wholesale dealer in drugs. It is seen from this study that digitalis of great toxicity has been produced in widely different parts of the country.

Hale found that digitalis from the government drug garden at Arlington, Va., harvest of 1907, was of high potency. Our sample from this source also had a high assay value. It was obtained from the Bureau of Plant Industry in the fall of 1916.

Digitalis grown by Mr. F. A. Miller at Greenfield, Ind., from Oregon seed, was equal to the pharmacopeial standard. Another sample of digitalis grown on the same farm from Oregon seed was tested by Miller and Baker,[8] and found to have a value of 0.009 c.c.

Roth, as we have already stated, examined four samples of wild Oregon leaf and all yielded tinctures that were found on biologic assay to be stronger than the Pharmacopeia demands. That large quantities of wild Oregon leaf is strong enough to be of therapeutic value in the usual dosage is a view apparently widely held, not only in Oregon but also in other parts of the country. It seems to be based largely on Roth's studies.

Three samples of wild Oregon leaf examined by us were all weak. One of these was a well mixed sample from a lot of 840 pounds gathered in the summer of 1918. A tincture made from this was only a little more than half the strength demanded by the Pharmacopeia. Two samples of wild leaf from Linton, Ore., were obtained for us by Dr. A. E. P. Rockwell of Worcester, Mass. One lot was gathered in May, 1917; the other in June, 1917. The two tinctures prepared from these were of the same strength. The amount necessary to produce systolic standstill was 0.01 c.c. per gram frog weight, or 60 per cent. of standard strength. A sample of cultivated digitalis was gathered in April, 1917, in the same locality. The leaves were the first shoots of spring. Most of them were less than 4 inches in length. A 10 per cent. infusion prepared from this had a value of 0.01 c.c. As only five out of nineteen lots of American digitalis yielded stronger infusions, it is probable that a tincture of this leaf would have equaled the pharmacopeial standard. Leaves from second year cultivated plants growing in the same neighborhood were gathered in July just before flowering. The buds were fully developed and would have unfolded within a few days. Some of the leaves were 27 inches long. A tincture from these plants had a value of 0.014 c.c., or 43 per cent. of the standard. All of these four lots were grown on similar soil with the exception of a small application of fertilizer in the garden samples and were developed under the same general conditions. The leaves were artificially dried.

Six lots of leaf grown in the state of Washington were examined. The strongest and the weakest digitalis in our series of twenty-five samples came from this state. Only one of the six tinctures prepared from the Washington grown digitalis equaled the pharmacopeial standard. The strongest leaf from Washington (crop of 1916) had a value of 0.003 c.c. In 1917 the collector who furnished this gathered and preserved for us a quantity of Washington leaf that had a value of only 0.011 c.c.

Three lots of digitalis grown in Nebraska were assayed. One of these yielded a tincture that was stronger than the standard, the value being 0.005 c.c. The other two were not quite up to the required strength. Tinctures from these had values of 0.007 and 0.008 c.c.

Three of the four lots grown in Virginia were above the standard. Leaf from Balleston, Va., of the harvest of 1916, had a value of 0.003 c.c. No one, to our knowledge, making biologic assays on *Rana pipiens*, has reported any observations on digitalis of greater toxicity. A sample of digitalis from the same locality, the following year, had a strength of only 0.007 c.c.

A specimen of "digitol" furnished by the H. K. Mulford Company and made from leaf grown at Glen Olden, Pa., was slightly below the pharmacopeial standard.

Three lots of digitalis grown in Massachusetts have been tested. All were of poor strength. The one tested in Table 2 was obtained from mature second year plants. Wesselhoeft tested a homeopathic tincture (10 per cent.) made from fresh, undried digitalis grown in Hyde Park, a suburb of Boston. This had a value of 0.040 c.c., or 15 per cent. of the standard. A 10 per cent. infusion of digitalis put up by the "Shakers of Ayer" yielded a negative result when a dose of 0.050 c.c. was given.

7. The Pharmacopeia requires that digitalis leaf should be of such strength that 0.006 c.c. of a tincture prepared from it per gram frog weight will produce systolic standstill of the heart in one hour.

8. Miller and Baker: J. Am. Pharm. A. **111**: 304, 1914.

A lot of digitalis grown in Portland, Maine, was found to be fairly strong, but not quite up to standard strength.

### DIFFERENCE IN STRENGTH DUE TO SOIL AND CLIMATE

*Digitalis purpurea* is a European wild plant that is found in Portugal, Spain, France, Germany, England and the Madeira Islands. In some of these countries it grows much more profusely than in others. Brought to America for cultivation in flower gardens, it has in some sections become a weed and is now found growing wild in great abundance in California, Oregon, Washington, and to some extent in West Virginia. Prof. J. U. Lloyd[9] says that in the valley of the Honeoye River, N. Y., digitalis planted in 1820 in a flower garden was growing in 1912 as a great wild bed, self sown from year to year. It will grow in Oregon, according to information obtained by Roth, on practically any soil that will absorb moisture. The samples he tested grew on clayey soil. Digitalis does not do well on limestone lands, as Lloyd learned from personal observation, when he attempted to cultivate the drug in Kentucky. It is found generally on soil containing iron and manganese. The latter is assumed to be essential for the growth of the plant. It is said that digitalis does not grow in Switzerland, and this is attributed to lack of iron and manganese in the soil.

The toxicity of the leaf may vary with the locality in which it grows. It has been long known that the digitalis from the neighborhood of Strassburg is so strong that when given in the usual doses poisonous effects are quickly manifested. By biologic tests on frogs, Alsatian digitalis has been found to be twice as strong as the standard value established by Focke, $V = 5$. Gottlieb used a frog unit similar to a diphtheria antitoxin unit. The amount of digitalis that will produce systolic standstill in a frog of 30 gm. weight within thirty minutes was taken as the unit. Good leaf, according to Gottlieb, should contain fifty units. Digitalis grown in the Vosges Mountains obtained from the pharmacy of the Strassburg Medical Clinic contained from 100 to 120 frog units.[10]

Cushny, according to Symes,[11] has found only small variations in different samples obtained from the same source.

Symes[12] examined a large number of samples of English digitalis grown in three successive years. The average activity of tinctures made in 1911 was about twice the standard adopted; namely, that of Dixon and Haynes,[13] a minimal lethal dose of 0.75 c.c. per hundred gm. (Houghton's[14] twelve-hour method, using *Rana temporaria*). Samples from the same sources in 1912 were notably weaker than those collected in 1911, but still 40 per cent. above standard. Samples of the harvest of 1913 were less active, but averaged 10 per cent. above the standard. The weather in the spring and summer of 1910 in Great Britain was dry, dull and variably warm; in 1911 bright and hot; in 1912 wet, dull and cold, and in 1913 dry, dull and warm. Only leaves of second year plants were gathered, so that two years of weather should be considered in comparing strength of leaves to weather conditions. It would seem as if the good year 1911 influenced the activity of the leaf of that harvest and also, by its effect on first year plants, the harvest of the following year.

Our studies show that digitalis of the highest activity has been grown in Washington, Virginia, Nebraska, Oregon and Wisconsin. Digitalis that yielded tinctures of standard strength have been obtained from Indiana and Minnesota. Leaf of very poor quality, grown apparently under similar conditions, has been found in the same states (Oregon and Washington) that have yielded the best digitalis. The three samples of Massachusetts digitalis assayed were weak. Apparently the soil here is not favorable for the growth of active digitalis, although more samples should be studied.

That soil and climatic conditions are more important than the selection of seed, is suggested by the experiments of Miller and Baker.[8] Seed of *Digitalis purpurea* from Japan, England and Oregon were planted in the drug farm at Greenfield, Ind. All three yielded leaves of the same strength. Tinctures made from each produced systolic arrest of the heart with a minimal dose of 0.009 c.c.

### DIFFERENCE IN STRENGTH DUE TO METHOD OF DRYING

The relation of the method of drying to activity of leaf is not clearly brought out by our studies. Focke[15] maintains that the leaf should be dried within three days of gathering at a temperature between 60 and 80 C., until the moisture content is reduced to 1.5 per cent. He directs that it should be then packed in air-tight containers. Newcomb,[16] of the University of Minnesota, dries the leaf at a temperature of 100 C. for eight-hour periods on three successive days. It will be seen in Table 3 that the University of Minnesota leaf we examined contained considerable moisture, although less than the other samples. It was sent to us in a closed container.

TABLE 3.—PERCENTAGE OF MOISTURE IN DIGITALIS LEAF

| | |
|---|---|
| University of Minnesota, 1915 crop | 6.3 |
| Washington state, received from Department of Agriculture | 6.8 |
| Grinnell College, Grinnell, Iowa | 7.4 |
| Washington (Hobart), second year leaf | 7.5 |
| Washington (Hobart), first year leaf | 7.6 |
| Pennsylvania (Glen Olden), received from the H. K. Mulford Co. | 8.7 |

One of the two strongest samples in our series, the first year digitalis leaves from Hobart, Wash., had 7.6 per cent. of moisture. It should be remembered that the leaves take up considerable water after they are dried, unless kept in air-tight receptacles.

It has never, to our knowledge, been demonstrated by biologic assay that leaves dried at room temperature are less potent than the leaves from the same plants dried rapidly at a high temperature. It is possible that they deteriorate more quickly, as Focke maintains. Most of the lots of digitalis studied by us were artificially dried. The air-dried samples of Oregon leaves assayed by Roth were stronger than the Pharmacopeia requires. Our sample of air-dried Oregon digitalis, harvest of 1918, contained considerable moisture and was of low strength, the value of the tincture being 0.011 c.c.

9. Lloyd, J. U.: Am. J. Pharm. **85**: 214, 1913.
10. Fraenkel: Ergebn. d. inner. Med. u. Kinderh., 1908, p. 89.
11. Symes: Brit. M. J.: **1**: 1343 (June 20) 1914.
12. Symes: Pharm. J. & Pharmacist **39**: 192, 1914.
13. Dixon and Haynes: Med. Mag. London, Jan., 1906, p. 1, quoted by Symes.
14. Houghton, G. M.: The Pharmacologic Assay of the Heart Tonics J. A. M. A. **31**: 959 (Oct. 22) 1898. Houghton and Hamilton: Am. J. Pharm. **81**: 461 (Oct.) 1909.
15. Focke: Arch. d. Pharm. **241**: 123, 1903; Therap. d. Gegenw. **45**: 250, 1904.
16. Newcomb: Am. J. Pharm. **84**: 201, 1912.

### ACTIVITY OF WATER-SOLUBLE GLUCOSIDS IN AMERICAN DIGITALIS

The active principles in digitalis leaves have not been obtained in a pure state. The view is held by Cushny[17] that there are two active glucosids present. These are digitoxin and digitalein. The former is insoluble in water. Kiliani's studies[18] have inclined him to the view that a pure digitalein existed in the leaves that was easily soluble in water and very active. All attempts to isolate it were unsuccessful. Schmiedeberg and Kiliani believe that the digitalein that has been obtained from both the seeds and the leaves is a mixture of substances. They have used the term for the water-soluble glucosids that are certainly present in digitalis.

Kraft[19] obtained a water-soluble substance which he maintained was the pure digitalein that chemists had been seeking. He calls it "gitalin." It is easily decomposed by heat and reagents. The hydrate of gitalin was obtained in a crystalline state. It was almost insoluble in water. The so-called digitoxin obtained by Keller's method of quantitative analysis consists chiefly of gitalin with a little pure digitoxin. After a watery extract of the leaves had been made, a small amount of pure digitoxin and a considerable amount of gitalin was obtained from the residue by treatment with alcohol. Kiliani, after carefully examining a number of specimens of gitalin, concluded that it was not a chemically pure body, but a mixture. The crystalline gitalin "hydrate" closely resembled a substance Kiliani has studied and named $\beta$-digitoxin.

This brief summary of recent chemical studies shows how meager is the present knowledge of the subject. It indicates the importance of studying, by biologic methods, the aqueous as well as the alcoholic extracts of the leaves.

The activity of the water-soluble substances has been studied in nineteen samples of American digitalis by injecting frogs with freshly prepared 10 per cent. infusions. The samples are arranged in order of their strength in Table 4.

For comparison, the dose of tincture required to produce systolic standstill is also given. Some of the 10 per cent. infusions were stronger than the majority of tinctures examined. The greatest strength in water-soluble principles was exhibited by the samples of first year leaf from Hobart, Wash., which furnished also one of the two strongest tinctures. The 10 per cent. infusion of this leaf was exceeded in toxicity by only five of the tinctures in our series. No imported digitalis examined in this laboratory has yielded an infusion as strong as this. All the leaves that equaled or exceeded the requirements of the Pharmacopeia were found to be strong in water-soluble principles.

There was, however, no fixed relation between the activity of the tincture and the infusion, even when the tests were made on the same lot of frogs. If the tincture is taken as a measure of this total toxicity, then the aqueous extract of the Minnesota leaf tested, March 20, 1917, which gave a value of 0.007 c.c., was 71 per cent. of the strength of the leaf, as the tinctures tested, March 22, 1917, had a value of 0.005 c.c. On the other hand, the strength of the aqueous extract made from Washington leaf obtained from the Department of Agriculture was found to be 0.028, March 1, 1917, which was only 38 per cent. of the activity of the tincture of the same leaf tested, March 15, 1917. The results of these comparative tests show that the proportion of water-soluble principles differ widely in different lots of digitalis. Most of the lots of imported leaf examined have contained less of the water-soluble principles than the majority of the samples of American digitalis we have assayed.

TABLE 4.—ARRANGEMENT OF SAMPLES OF DIGITALIS IN THE ORDER OF THEIR STRENGTH

| Sample No. | Source and Description of Sample | Minimal Dose Required to Produce Systolic Standstill: 10 per Cent. Infusion Date | 10 per Cent. Infusion Dose | 10 per Cent. Tincture Date | 10 per Cent. Tincture Dose |
|---|---|---|---|---|---|
| 1 | Washington (Hobart), first year leaf | 3/13/17 | 0.006 | 3/12/17 | 0.003 |
| 2 | Virginia (Balleston), 1916 crop | 4/13/17 | 0.007 | 4/ 6/17 | 0.003 |
| 3 | Minnesota (Minneapolis), university drug farm, 1915 crop | 3/20/17 | 0.007 | 3/22/17 | 0.005 |
| 4 | Wisconsin (Madison), 1916, university drug farm | 10/30/16 | 0.007 | 4/ 6/17 | 0.004 |
| 5 | Virginia (Marion), harvest of 1918 | 12/2/18 | 0.008 | 4/ 4/19 | 0.005 |
| 6 | Virginia (Arlington), Bureau of Plant Industry | 3/ 5/17 | 0.008 | 4/17/17 | 0.006 |
| 7 | Nebraska (Lincoln), university drug farm | 5/17/17 | 0.008 | 10/26/17 | 0.005 |
| 8 | Indiana, grown from Oregon seed, second year leaf | 5/23/17 | 0.008 | 10/ 3/17 | 0.006 |
| 9 | Nebraska (Lincoln), first year leaf, 1915 | 5/29/17 | 0.010 | 10/15/17 | 0.007 |
| 10 | Oregon (Linton), 1917, cultivated, gathered in April | 5/19/17 | 0.010 | | |
| 11 | Pennsylvania (Glen Olden) | 5/11/17 | 0.011 | | |
| 12 | Wisconsin (Madison), university drug farm; obtained from Johns Hopkins Hospital, 1915 | 12/21/15 | 0.012 | | |
| 13 | Nebraska (Lincoln), second year leaf, 1916 | 5/31/17 | 0.016 | 10/24/17 | 0.008 |
| 14 | Oregon, 1918 | 8/ 2/18 | 0.016 | 8/ 2/18 | 0.011 |
| 15 | Maine (Portland) | 3/27/17 | 0.017 | 5/15/17 | 0.007 |
| 16 | Washington (Hobart), second year leaf | 3/ 2/17 | 0.020 | 4/18/17 | 0.008 |
| 17 | Virginia (Balleston), 1917 | | 0.023 | | 0.007 |
| 18 | Massachusetts (Andover) | 5/31/17 | 0.025 | 9/27/17 | 0.011 |
| 19 | Washington; obtained from the Department of Agriculture | 3/ 1/17 | 0.028 | 3/15/17 | 0.001 |

### TOXICITY OF VARIOUS SPECIES AND VARIETIES OF DIGITALIS

There are twenty-three or more species of digitalis and numerous varieties. As early as 1888, Paschkis[20] stated that *Digitalis ambigua* contained the same constituents as *Digitalis purpurea*, and that the medicinal properties of the two are identical. Boudgest[21] found that *Digitalis ambigua* was fully as active therapeutically as *Digitalis purpurea*.

Miller and Baker[8] tested on frogs a number of different species of digitalis that they had grown at Greenfield, Ind. Eighty-three per cent. of the samples tested had a greater toxicity than *Digitalis purpurea*. *Digitalis lanata*, a species quite distinct from *Digitalis purpurea*, had the highest value. The amount required to produce systolic standstill of the heart was 0.0003 gm. of leaf in the form of tincture, per gram frog weight. Only two of the lots of leaves of *Digitalis purpurea* tested in our laboratory have equaled this in strength (Table 2). The weakest leaf assayed by Miller and Baker was *Gloxinae flora alba*, which had a value of 0.0019. Haskell and Miller[22] found that the *Digitalis ambigua*, dried at 100 C., had a value of 0.00055 and *Digitalis grandiflora* a value of 0.0009.

R. E. Morris of the University of Minnesota tested *Digitalis lutea* on cats. He used tinctures and infusions from the leaves of Minnesota first year plants. He was impressed with the absence of irritating action on the nervous system and the quiet lethal

17. Cushny: Textbook of Pharmacology and Therapeutics, Ed. 7, Philadelphia, 1918, p. 399.
18. Kiliani: Arch. d. Pharm. **252**: 13, 1914.
19. Kraft: Arch. d. Pharm. **250**: 118, 1912.
20. Paschkis: Apoth. Ztg. 1888, p. 869, cited by Miller and Baker (Footnote 8).
21. Boudgest: Pharm. Ztg. **48**: No. 42, 1913, cited by Miller and Baker (Footnote 8).
22. Haskell and Miller: J. Am. Pharm. A. **3**, 1914.

period. With the hope that it would cause less gastrointestinal disturbance than *Digitalis purpurea*, he studied with S. M. White[23] its therapeutic action on patients, and found that it produced effects apparently the same as *Digitalis purpurea*, except that nausea and vomiting appeared to be less frequent.

We have tested on frogs the activity of a sample of *Digitalis lutea*, grown in 1913 on the drug farm of the University of Minnesota and furnished to us by Dr. Morris. The tincture made from this had a value of 0.004 c.c. per gram frog weight. This assay was made, May 18, 1917. Only two of our twenty-five samples of *Digitalis purpurea* were stronger.

Specimens of two hybrids were sent to us by F. A. Miller of Greenfield, Ind. Our results are given in Table 5.

TABLE 5.—DIGITALIS HYBRIDS TESTED BY ONE-HOUR FROG METHOD AT A TEMPERATURE OF 20 C.

| | 10 per Cent. Tincture | 10 per Cent. Infusion |
|---|---|---|
| Hybrid digitalis ambigua × purpurea..... | 0.008 | 0.010 |
| Hybrid digitalis ambigua × lanata..... | 0.007 | 0.008 |

Both were fairly strong in alcohol-soluble constituents, but not equal to the standard. The striking feature was the high percentage of water-soluble principles, amounting in the hybrid *Digitalis ambigua* × *lanata* to 88 per cent. Only three of the samples of *Digitalis purpurea* we studied yielded an aqueous extract of greater toxicity than *Digitalis ambigua* × *lanata*.

## CONCLUSIONS

The best American digitalis, both wild and cultivated, is equal in activity to the best European digitalis. Specimens of high potency have been obtained from Virginia, Nebraska, Wisconsin, Minnesota, Oregon and Washington. The majority of samples of American digitalis examined were of low potency. No less than seventeen out of twenty-five samples of American digitalis were below the standard of strength established by the Pharmacopeia. The average strength of the American digitalis, however, was greater than that of the imported digitalis we have examined.

All digitalis should be tested biologically before it is gathered in large quantities for therapeutic use.

23. White, S. M., and Morris, R. E.: The Eggleston Method of Administering Digitalis, Arch. Int. Med. **21**: 740 (June) 1918.

**The Ravages of Smallpox.**—In the eighteenth century, smallpox was more common than is measles today. In 1802 a speaker in the British Parliament declared that "it is proved that in this United Kingdom alone 45,000 persons died annually of the smallpox, but throughout the world what is it? Not a second is struck by the hand of time but a victim is sacrified on the altar of that most horrible of disorders, the smallpox." A few years later Lord Macauley said of the disease: "Smallpox was always present, filling churchyards with corpses, tormenting with constant fear all whom it had not yet stricken, leaving in those whose lives it spoiled the hidden traces of its power, turning the babe into a changeling, at which the mother shuddered, and making the eyes and cheeks of the betrothed maiden badges of horror to the lover." The history of smallpox in our own country tells the same story. In 1702, 14.4 per cent. of the population died from the disease. Nineteen years later, 5,989 out of the 11,000 inhabitants of Boston contracted the disease, 840 fatally. In 1730, it again ran riot in Boston, claiming nearly 500 victims out of a sick roll of 4,000. It stalked among the colonies like the instrument of a remorseless avenger.

# *Clinical Notes, Suggestions, and New Instruments*

## GANGRENE FOLLOWING AN INJECTION OF ARSPHENAMIN

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Surgeon to Wesley Hospital

*History.*—O. P. M., aged 35, married, an American laborer, family history negative, had his first attack of gonorrhea in 1903 and got over this in a short time. One year later he had a second attack, developing a double epididymitis, and was in the hospital five days. The next year he had a chancroid on the dorsum of the foreskin, which healed promptly. In June, 1917, when I saw him, he had a chancre on the right side of the shaft of the penis about 1 cm. from the pubis. I gave him an injection of 0.4 gm. of arsphenamin and a second one a week later. About one month after this his wife was in the hospital for a double pyosalpinx. She also had an ulcer the size of a dime on the anterior part of the cervix uteri. I gave her one injection of arsphenamin, after which she left the hospital, and I did not see either her or her husband again until Aug. 31, 1919.

In June, 1919, a soft chancre appeared on the penis. At this time the patient had a double adenitis. These did not need to be opened, however, and in two weeks he was able to resume work. In June, 1919, he had an attack of tonsillitis. His throat grew worse, and in August he had his tonsils removed. They were badly diseased. The next day at 9 a. m. he was given an injection of arsphenamin in the vein of the left elbow. The physician who gave this injection describes his technic in a letter to me as follows:

The amount of solution used was about 250 c.c. and was given by the three-way cock method with a 10 c.c. syringe. First the syringe was filled with physiologic sodium chlorid solution and the needle filled and inserted into the vein. The blood flowed freely into the syringe, the salt solution basin was set aside, and the arsphenamin substituted in its place. The syringe was filled by means of the three-way cock with the arsphenamin solution and the solution injected into the vein. This process was repeated until the 250 c.c. solution of arsphenamin had been given. The vein was enetered by the needle at the first attempt. The patient complained of a severe pain in his hand at the time. In a few minutes after the injection his hand was white and death-like cold. He complained of anesthesia and inability to move the hand, and there was a decided wrist drop. Three hours later there was tonic contraction of all the fingers and the wrist. The peripheral circulation was poor. The hand was cold all the time. The next day the tonic contracture was somewhat less, and from that time until two weeks later, at which time he left the hospital, there was very little feeling in the hand. It was apparent that his fingers were becoming gangrenous. About twenty minutes were consumed in giving the injection.

The patient states that when the solution was started it felt as though a match had been touched to his fingers, or he had taken hold of an electric wire. The pain grew worse during the injection and was not relieved until the next afternoon. Within two hours after the injection his arm began to swell around the needle hole, the swelling extending down over the forearm and up over the biceps muscle. Hot applications were applied to the arm. These were used continuously for two days, after which warm alcoholic dressings were kept on the arm for forty-eight hours. At some time during the use of the hot applications the dorsal surface of the forearm, hand and fingers was quite badly burned. Owing to the anesthetic condition that prevailed he knew nothing about the burn until he saw the large blisters. After ninety-six hours a dry powdered dressing was used on his arm.

*Examination.*—He said he had lost 29 pounds. He was 6 feet tall, weighed 146 pounds. The eyes were sunken and he had an anxious expression. The left arm was carried at an angle of 45 degrees. It could be flexed until the hand was within 6 inches of the shoulder. This caused him considerable pain, however. The forearm could be extended to

within 15 degrees of a straight line. The teeth were in poor condition. The eyes showed normal reaction of the pupils to light and distance. The reflexes were lively throughout. The heart showed a soft mitral systolic murmur. The lungs and abdomen were negative.

The back of the left hand and forearm were covered with large blisters. There were also blisters over the dorsal surface of the fingers and thumb. The cutaneous covering had been removed from the blisters of the back of the hand, leaving a large oozing surface. All the nails were black. The thumb was black for 5 mm. on the palmar surface. The gangrenous area extended through to the nail. There was also a black ring extending around the thumb over the last joint. The skin over all the gangrenous area was extremely shriveled, dry and hard.

The index finger was dead and shrunken from the middle phalangeal joint. The middle finger was also dead, black and shrunken within 5 mm. of the middle phalangeal joint. The ring finger had a well marked line of gangrene midway between the second and third phalangeal joint. About one half of the last phalangeal joint of both little finger and thumb were gangrenous.

There were a number of blisters over the tops of the fingers and thumbs, each containing quite a little pus.

The muscles of the forearm were very hard, and the entire cutaneous covering of the forearm and hand, excepting where raw areas were, was shrunken, hard and thick. There was very slight sensation for hot and cold over the hand and fingers and very little pain sensation on being stuck with a pin.

The wrist could be moved slightly.

*Operation and Result.*—September 11, under ether anesthesia, I amputated the thumb slightly distal to the end of the last phalanx. The index finger was amputated 1 cm. proximal to the middle phalangeal joint. The middle finger was disarticulated at the middle phalangeal joint. Owing to the desire to save as much of the fingers as possible, the ring finger was amputated 1 cm. distal to the middle phalangeal joint.

Five mm. of tissue were removed from the end of the little finger.

The wound healed in a surprisingly kind manner.

At this time there is increased motion of the elbow joint, the wrist and some of the finger stumps. Sensation has greatly improved. The oozing areas of the hand are entirely healed.

306 Schweiter Building.

## AN EASY METHOD OF MARKING THE SKIN

William Allen Pusey, M.D., Chicago

It is often desirable to outline a figure on the skin, but it is not always easy to do so. A skin pencil is not always available, and one, even of the best quality, marks the skin with some difficulty. According to a method suggested by Béclère,[1] the spot to be marked is wiped off with a bit of cotton wet with gasoline. This moistened surface can then very readily be marked with a "paper pencil." This method has the objection that gasoline must be at hand, and also that on an inflamed or broken surface this preliminary application of gasoline is irritating or painful. A much simpler method, without the objection of irritation, is to moisten the surface with water from a cotton sponge, and then use an ordinary copying pencil. The lead of a copying pencil marks with ease on the moistened skin. With this method it is perfectly easy to outline with a distinct violet line any area on the skin. Such markings can be made even on a sterile surface by first washing the end of the pencil in a concentrated solution of mercuric chlorid, and by moistening the surface with a sterile solution. The mark can readily be wiped off with soap and water. The purple lines may be photographed, but not very well.

7 West Madison Street.

1. Béclère, H.: J. de radiol. d'electrol. **3**: 272 (June) 1919; abstr. J. A. M. A. **73**: 724 (Aug. 30) 1919.

# *Therapeutics*

A Department Devoted to the Improvement of Therapy. A Forum for the Discussion of the Use of Drugs and Other Remedies in the Treatment of Disease.

## USE AND ABUSE OF CATHARTICS*

*(Continued from page 1529)*

### LIQUID PETROLATUM AS A LAXATIVE

The rapidity with which "mineral oil," one of the more recent additions to our materia medica, has conquered the globe has been phenomenal. It is now a most extensively used medicinal substance; and, if its sale were a real indication of its medicinal value, we should have to consider it one of the most valuable of medicaments. While not ready to grant this preeminence, we may at least view its popularity without alarm; for, of all substances with which mankind has belabored its system, petrolatum is surely the most inert and perhaps the most harmless.

Petrolatum is a bland, odorless, tasteless and colorless liquid, indigestible, as well as incapable of decomposition by bacteria; hence it cannot become rancid. It is not absorbed; therefore it cannot produce poisoning in any dose. A pint of liquid petrolatum has been given in a few hours without untoward results.

Owing to its inocuousness, this substance should be the laxative of first consideration. While it is merely of temporary value in habitual chronic constipation and possibly may still further increase the intestinal sluggishness by lessening the amount of work—of exercise—of the intestinal and abdominal muscles, it seems to have an actual curative effect in certain conditions, as, for instance, in spastic constipation, in which, by lessening the irritation, it may ultimately succeed in lessening the irritability.

Liquid petrolatum is indicated whenever it is desired to soften the feces. The oil, being indigestible, remains in the feces in the form of globules. To speak of this action as "lubrication," as is often done, is hardly correct. Lubrication depends on the formation of an oil film, and such a one it is impossible to apply to a water-soaked membrane like the intestinal mucosa, or to the ordinary moist fecal mass. When an excess of oil has been ingested it does not apply itself as a film to the surface, but remains separate from it, giving rise to the much complained of "leak" of oil through the anus, which may occur even with small doses.

As liquid petrolatum does not give rise to irritant products such as the fatty acids liberated by the digestion of fatty oils, especially of castor oil, it may be given with safety for irritation of the gastro-intestinal tract. By its softening effect on the stools it may even have a healing action on superficial lesions of the mucosa.

In intestinal stasis due to crippling of the intestine, be this from kinks or other forms of obstruction, or even malignant tumor, its softening effect on the feces is likely to prove valuable.

The dose varies from 15 to 90 c.c. When larger dosage is employed, there is likelihood of leakage of the oil. Sometimes free oil is passed in a bowel movement, or even without one. It was supposed that the

* This is the sixth of a series of articles on the pharmacology, physiology and practical application of the common laxatives and cathartics. The first article appeared October 18.

"heavy" liquid petrolatum, by reason of its greater viscosity, would be less likely to give rise to leakage. That this is not the case was shown by a collective investigation carried on by Bastedo,[2] under the auspices of the Committee on Therapeutic Research of the Council on Pharmacy and Chemistry. To ascertain whether any difference existed in the efficacy of the different varieties of liquid petrolatum, clinicians were furnished with specimens of light Russian liquid petrolatum, heavy Russian liquid petrolatum, and an American brand of light liquid petrolatum. To avoid bias, the specimens were designated by numbers or letters. The conclusion of this study was that the differences were too slight to be of importance. There was no difference in the dose required, in effect on stomach or stools, or in their tendency to give rise to leakage.

As a general proposition, when leakage occurs, it is an indication that the dose should be reduced. If such reduced dose is insufficient to act on the bowels, it may be reinforced by a specific stimulant to peristalsis, such as cascara sagrada. The oil seems to be devoid of any effect on the intestinal musculature except that it diminishes the work of the muscle by softening the feces. In cases in which synergistic use of cascara is contraindicated, as for example in spastic constipation, it might be well to try a petrolatum of higher melting point, like petrolatum, U. S. P., which it is reasonable to assume might be less likely to produce this undesirable effect.

Emulsification is another expedient that it seems ought to be capable of overcoming the tendency to leakage. The National Formulary contains the following formula:

EMULSUM PETROLATI, N. F.

| | Gm. or C.c. |
|---|---|
| Petrolatum | 22.5 |
| Expressed oil of almond | 22.5 |
| Acacia | 12.5 |
| Syrup | 10.0 |
| Tincture of lemon peel | 1.5 |
| Water, to make | 100.0 |

Average dose: one tablespoonful.

This preparation would be worth trying in such cases; and reports on its success or failure in meeting the requirements of activity, pleasantness, and absence of tendency to "leak" would be of interest.

Our choice among the different brands of petrolatum should be chiefly determined by palatability. This depends on the degree to which the refinement of the oil is carried out.[3]

Fancy named products should be avoided. Not only are such products more expensive, but when any one of these half hundred brands is prescribed, the druggist, who may have half a dozen other brands that are just as good on his shelves, will have to buy a full bottle of the product specified and charge the patient the price of the whole bottle, even though the prescription calls for but part of it—the rest, probably, remaining on his shelf indefinitely. Such specifying is an injustice to the druggist and to the patient. Why not trust pharmacopeal quality? If the druggist does not dispense U. S. P. quality, he can be legally prosecuted. Of course, if U. S. P. quality is not good enough, specifying may be necessary until the quality of the official product has been improved. The official quality of heavy liquid petrolatum (petrolatum liquidum grave) is satisfactory. If, however, one desired an extra fine product, and higher price is no object, one might specify the name of a distributor who promotes a possibly somewhat superior product in an ethical manner, for instance, Squibb, to mention one such.

As the oil is tasteless and odorless, it is probably best taken in its pure state. It may be floated in some pleasantly flavored fluid, such as orange juice or grape juice. Flavoring by means of a pleasant volatile oil may be resorted to, should the patient prefer a distinctive flavor to the insipidness of the liquid petrolatum. Hilton has experimented on this matter, and found that per 500 c.c. of oil, these quantities of one or the other flavoring oils are suitable: anethol, 10 drops; oil of almond, 15; oil of cloves, 10; oil of cinnamon, 5; oil of peppermint, 15; oil of spearmint, 15, and methyl salicylate (wintergreen), 25 drops. To him, peppermint seemed the most pleasant flavor, with cardamom a close second. We must recognize the fact, however, that there are people who abhor one flavor, such as peppermint, enjoyed by another; and that any one is liable to tire of a decided flavor used frequently. Combinations of flavors—bouquets—are often more acceptable than single flavors, and enjoyed for a longer time. Thus the oil combination used in the flavoring of aromatic elixir might be used to make liquid petrolatum aromatic: oil of orange, 2.00; oil of lemon, 0.50; oil of coriander, 0.20; oil of anise, 0.05; liquid petrolatum, 1,000.

As the oil, when taken after meals, is likely to lie heavily on the stomach and produce other gastric distress—in Bastedo's investigation 20 per cent. complained of nausea or tendency to repeat—it is best to take it in such a way that it will interfere least with gastric digestion. This is secured by giving a dose, from 15 to 60 c.c. of it, at bed time, or else administering 15 c.c. one hour before each meal.

Patients given this laxative for the first time should understand that it does not produce an immediate effect, but that it may have to be taken for several days before results will be noted. When the desired effect is not obtained with the initial dose, the quantity should be increased until the stools have been sufficiently softened. The efficient dose is then to be maintained for a while—several weeks, perhaps—and then gradually reduced until regularity of bowel action has been secured or the minimal dose has been ascertained that is required for satisfactory function. It must be remembered that if kept up for some time a habit may be formed. While it may not be a serious one so far as concerns harm to the system, it is an expense to the individual and especially a nuisance.

*(To be continued)*

2. Bastedo, W. A.: Clinical Experience with Liquid Paraffin (Liquid Petrolatum), J. A. M. A. **64**: 808 (March 6) 1915.

3. In 1914, THE JOURNAL (May 30, p. 1740) published the following list of names under which liquid petrolatum was then known: adepsine oil, amilee, atoleine, atolin, blandine, crysmalin, deeline, glyco, glycoline, glymol, heavy petroleum oil, liquid albolene, liquid cosmoline, liquid fossiline, liquid geoline, liquid paraffin, liquid petrolatum, liquid saxoline, liquid vaseline, mineral glycerin, mineral oil, neutralol, olo, paraffin oil, paroline, petralol, petro, petrolax, petrolia, petronol, petrosio, rock oil, Russian liquid petrolatum, Russian mineral oil, Russian paraffin oil, Russol, saxol, terraline, terralbolia, usoline, water-white mineral oil, and white paraffin oil. To this list many more names, such as "nujol" and "purpetrol," would have to be added to bring it up to date. Here is a good illustration of the inexpediency of employing coined and copyrighted names in prescribing standard official products. S. L. Hilton (Petrolatum Liquidum, U. S. P. VIII, J. Am. Pharmaceut. A. **3**: 577, 1914) quoting the wholesale prices of various brands of liquid petrolatum, found that those with fancy coined names commanded a very much higher price than other oils on the open market—all, or nearly all, coming from the same source. Of course, manufacturers and dealers would not coin names if they did not expect to coin something substantial out of them.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

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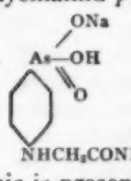
SATURDAY, NOVEMBER 22, 1919

## THERAPY AND RESEARCH

Few persons who have occasion to use arsphenamin (salvarsan) and its derivatives, or who contemplate the therapeutic usefulness which the introduction of these drugs into medical practice has embodied, realize the long and laborious scientific investigations that preceded the success inaugurated by Ehrlich. Modern chemotherapy of this sort has been the product of careful research in which ingenious and novel chemical syntheses were undertaken to evolve new compounds that were subsequently tested by animal experimentation before any attempt at clinical application was made. It is important to keep in mind the fundamental fact that the great discoveries of curative drugs were not made over night or by chance, as one may stumble on precious stones: they are rather the outcome of untiring effort directed by experimental genius. Each success is but the fortunate companion of almost innumerable preliminary or preparatory trials and many failures. Research is both the laborious and the continued search after truth, not the mere chance finding.

Some of the results of diligent and persistent researches in chemotherapy have recently been published from the Rockefeller Institute for Medical Research.[1] They involve the synthesis of certain new types of organic arsenic compounds intended to be applicable to the treatment of experimental trypanosome and spirochete infections. One of the promising products synthesized by Jacobs and Heidelberger[2] for trial is N-phenylglycinamid-*p*-arsonic acid,




in which the arsenic is present in the pentavalent form as presented by the arsonic acids. The aim has been to attempt to eliminate certain of the well known practical disadvantages of the now familiar arseno compounds. Trypanosomiasis affects different species in unlike ways. Brown and Pearce point out that in some, as rats and mice, it is chiefly characterized by the constant and progressively increasing number of trypanosomes in the peripheral blood, by the lack of any clinical manifestations, and by the relatively early death of the infected animal. Consequently, an effective therapeutic compound for the treatment of trypanosomiasis in such species must be biologically available within a short time after its administration, and must have sufficient speed and duration of action to halt and overcome the rapidly increasing blood infection, which is comparable with a fatal bacteremia. The trypanosomiasis of many of the larger animals, like the rabbit, on the other hand, is preeminently a tissue infection. To combat this, an effective drug must possess tissue penetration as well as trypanocidal power. These illustrations are sufficient to indicate the varied practical conditions that must be met to solve the therapeutic problem. They are likely to tax the ingenuity and persistence of the most assiduous and intelligent investigator.

The first of the new compounds described by the workers at the Rockefeller Institute is extremely easily soluble in water, forming neutral solutions that are stable. The animal tests indicate that the toxic effects are confined to doses relatively close to the minimum lethal dose, and the recovery from sublethal doses is rapid and complete. The new arsonic acid has already given indications of being "an agent of marked therapeutic action in the treatment of experimental trypanosomiasis in mice, rats and guinea-pigs." The "curative ratio" or fraction of the minimum lethal dose is small. Therapeutic doses are not followed by signs of organic or functional disturbance, but, on the contrary, the general physical condition of the treated animals shows an immediate improvement. In the more penetrating invasion of trypanosomes in rabbits, therapeutic efficiency has also been recorded by Pearce and Brown. Finally, they have noted promising effects in experimental infections with spirochetes of the *recurrens* group and by *Spirochaeta pallida*. The infection is ameliorated even though the spirochetes are not immediately destroyed. The Rockefeller Institute pathologists summarize this by comparing the result with that produced by more powerful spirocheticidal agents. The infecting micro-organisms are either affected in such a way that they eventually die off, or are destroyed by the host in such a way that no lasting immunity is developed in consequence of their destruction. For the present, the investigators go no further than to state that the new arsonic acid acts somewhat differently from the usual spirocheticidal agents. While it does not possess a considerable degree of spirocheticidal action, its chief effect is seen in the peculiar way it modifies or controls the course of these infections.

1. Jacobs, W. A., and Heidelberger, M.: Chemotherapy of Trypanosome and Spirochete Infections, Chemical Series I, N-phenylglycineamide-*p*-arsonic acid, J. Exper. Med. **30**: 411 (Nov.) 1919. Brown, W. H., and Pearce, Louise: Chemotherapy of Trypanosome and Spirochete Infections, Biological Series I, The Toxic action of N-phenylglycineamide-*p*-arsonic Acid, ibid., p. 417; II, The Therapeutic Action of N-phenylglycineamide-*p*-arsonic Acid in Experimental Trypanosomiasis of Mice, Rats and Guinea-Pigs, ibid., p. 437; III, The Therapeutic Action of N-phenylglycineamide-*p*-arsonic Acid in Experimental Trypanosomiasis of Rabbits, ibid., p. 455; IV, The Action of N-phenylglycineamide-*p*-arsonic Acid on Spirochete Infections, ibid., p. 483.

2. Jacobs, W. A., and Heidelberger, M.: J. Am. Chem. Soc. **41**: 1587, 1919.

It is not certain that these purely tentative experimental observations can be applied ultimately to the control of human infections. However, the persistence of the investigators, who have labored literally for years without signs of immediately successful results, needs appreciation and deserves high commendation. Such work is less conspicuous than brilliant feats of surgery or successful campaigns in public sanitation; it is none the less worthy of due recognition because it surely paves the way to permanent advances.

## SYPHILITIC AORTITIS

Though a disease may spring suddenly into prominence, it is not always certain that there is an actual increase in its prevalence. In recent years the importance of syphilis of the aorta in the production of a variety of clinical pictures has been emphasized with increasing frequency. Probably this is due to the great advances that have been made in the methods of detecting syphilis, particularly the discovery of the causal organism and the perfecting and wide use of the complement fixation test.

Physicians generally have not realized the frequency and importance of syphilitic aortitis. Recognition of the disease at the earliest possible moment is essential because of the necessity for prompt and energetic treatment. Recent figures cited by Schrumpf[1] indicate the frequency with which syphilitic aortitis occurs. Of more than 4,000 syphilitic males included in the report, about 10 per cent. presented definite evidence of syphilis of the internal organs, and half of this group of patients showed evidence of syphilis of the circulatory system. Over 5 per cent. of syphilitic males may therefore be expected to show definite changes in the circulatory organs. Three fourths of these will be cases of syphilis of the aorta, either with or without aneurysm.

Three common pictures are likely to be produced by syphilitic aortitis. These are aneurysm (particularly of the thoracic aorta), aortic regurgitation, and angina pectoris. Schrumpf analyzes 140 cases of aortic regurgitation and shows that practically three fourths of them are of syphilitic origin, the other one fourth being due to rheumatic endocarditis or to ordinary arteriosclerosis.

It is questionable whether we have yet developed satisfactory criteria for the early recognition of these cases. Schrumpf states that the average period elapsing between infection with syphilis and the development of aortic lesions is ten years. It is hardly likely that during these ten years the process in the aorta is entirely latent. The natural history of the disease would lead us to suppose that there are periods of latency alternating with periods of activity. The chief early symptom is retrosternal pain, which is often most marked under the upper sternum, is not usually dependent on exertion, and does not usually radiate to the neck or arms like the pain of true angina pectoris. This pain is accompanied by very few physical signs. There are no cardiac murmurs, but the first aortic sound may be dull and distant, and there may be so-called pulsatory plethora, namely, a marked pulsation of the peripheral vessels. During the active stages the Wassermann test is always strongly positive. The use of the roentgen ray may be valuable, particularly if local dilatations of parts of the aorta can thus be shown.

One may perhaps question whether such an outspoken symptom as substernal pain is associated with the early stages of a chronic process like syphilitic aortitis. It seems likely that by the time definite pain is produced the lesions are quite extensive, and it is questionable whether a really early diagnosis can be reached if symptoms are waited for. It seems highly probable that in the aorta, just as in the central nervous system, definite lesions may be present without any symptoms whatever, and it would seem that some method of diagnosing syphilitic aortitis during the presymptomatic period must be devised. Whether the use of the roentgen ray will furnish the solution is problematic, but at present no more promising method is in sight. Perhaps the most essential procedure is the return of syphilitic patients at stated intervals for thoracic roentgenography. Even in the absence of positive roentgenographic findings a syphilitic patient with a positive Wassermann reaction and no obvious evidence of the disease externally may be assumed to have a lesion in the aorta, especially if lumbar puncture shows that the nervous system is free from evidence of disease.

1. Schrumpf: Arch. f. Dermat. u. Syph. **126**, Part 3, 1919.

## THE PITUITARY IN DIABETES INSIPIDUS

Extracts of the posterior lobe, or pars nervosa, of the pituitary structure provoke an unmistakable change in the secretion of urine when they are introduced directly into the circulation. This renal effect has been compared to the secretion-promoting effect exerted by extracts of the duodenum on the pancreatic cells. Because of such experimental observation the pituitary has been assumed to exercise a regulatory influence on the functions of the kidney. Such reasoning, often applied in connection with the ductless glands, has grave limitations and is rarely conclusive. As a recent writer has remarked, it is by no means logical to assume or infer that the functional importance of an organ is demonstrated by the properties of an extract of it. If one applies such an argument to the galactogogue substance in the pituitary of a fish, the absurdity is obvious.

Other evidence for the functional interrelation of kidney and pituitary has been sought in the domain of pathology. In the chronic polyuria most frequently referred to as diabetes insipidus, involvement of the

pituitary, particularly of its junction with the brain, has been demonstrated repeatedly at necropsy; in fact, there are no records in which the pituitary was examined and found to be perfectly normal. Experimental pathology, by damaging the structures in the neighborhood of the posterior lobe of the pituitary, has frequently produced abnormalities in the flow of urine. Polyurias lasting from one to six months have followed the artificial lesions; yet such results have been exceptional and attained only by chance, apparently.

Kennaway and Mottram[1] of the Middlesex Hospital in London have added clinical evidence to the problem of pituitary function in connection with the kidney. The antidiuretic effect of pituitary extract given by subcutaneous injection was demonstrated both in a normal subject and in a case of diabetes insipidus. Administration of such preparations by mouth is ineffectual. It has been suggested that the antidiuretic effect is due to diminished absorption from the bowel so that less water is available for secretion through the kidneys. If we may trust the evidence of Konschegg and Schuster,[2] however, the effect is rather attributable to direct action on the kidneys. Kennaway and Mottram maintain that the immediate restoration of a normal state of the urine when pituitary extract is administered in diabetes insipidus provides the strongest evidence for the normal activity of the gland in regulating the secretion of urine. We must confess, however, that in view of the contradictions in the literature of the subject, and the indirect nature of both clinical and experimental evidence, it would be farfetched to maintain without reserve that disorder of the pituitary is in all cases the cause of chronic polyuria. Injection of pituitary extracts now appears to be the most effectual mode of treatment. However, every day obvious examples of the limitations of such a procedure are encountered.

1. Kennaway, E. L., and Mottram, J. C.: Observations upon Two Cases of Diabetes Insipidus, with an Account of the Literature Relating to an Association Between the Pituitary Gland and This Disease, Quart. J. Med. **12**: 225 (April) 1919.
2. Konschegg and Schuster: Deutsch. med. Wchnschr. **41**: 1091, 1915.

## THE SURPRISING CALORIC VALUE OF DAINTIES EATEN BETWEEN MEALS

Now that the war is over, many of the restrictions imposed by governmental mandate, the exigencies of commerce, or a patriotic conscience need no longer apply to the behavior of our population. "Sugar and spice and everything nice" may once again be included in the diet of American homes. We may at length return to the consumption of those dietary luxuries that have attained great popularity in the United States. Candy is no longer tabued, nor is purchase restricted by a food administration. Strangely enough, the enforcement of prohibition has apparently increased the use of candy, as it has augmented the consumption of the sugar-containing temperance beverages. The calorific potency of alcohol is likely to be replaced by the fuel value of "sweets" eaten here and there between meals.

It is commonly believed that these "extra foods" consumed apart from our regular meals on the most varied occasions, frequently several times a day, play a relatively insignificant rôle in the total value of our food fuel. Not long ago, however, Benedict[1] called attention to the true value which ice cream, soda water and various comparable popular American extra foods really represent in terms of calories, the standard units of food energy. Some of the commonly served portions eaten in haphazard fashion on the spur of the moment may be equivalent to as much as 500 calories, while 100-calory portions are anything but unusual. In a more recent contribution,[2] the same investigators have brought further actual evidence of the unexpected food value of many of the items innocently consumed without thought of possible nourishment therein by thousands every day. Prior to the recent inflation of prices, from 50 to 60 calories were frequently obtainable in so-called penny candies; in some of the cheap nut candies the yield even exceeded 100 calories for the small coin that delights the child.

The eating of "extra food" is by no means confined to children. The adult man and woman who depend on the meal-time food fuel of from 2,000 to 3,000 calories a day indulge in candy as a pastime or eat an after-theater lunch for the sake of sociability—not because they feel the need of more food nor because they appreciate the magnitude of the diet intake. It will come as a surprise to most persons to learn on reliable authority that a single caramel, a nougatine or a penny's worth of candy may furnish sufficient energy to supply the extra heat needed for walking a mile or more. Equally startling will be the news that the ingestion of three seemingly insignificant, medium-sized olives can yield the amount of heat liberated in a half-mile walk. We are informed[2] that for a man of average weight to walk from the bottom to the top of Washington Monument would require an extra heat production of 80 calories. The energy expended in this not inconsiderable effort may be completely replaced by the consumption of less than half a doughnut, six walnuts, five large olives or four pretzels. Perhaps we shall learn from such facts how futile a "constitutional" walk is in any attempt to combat the accumulating energy from undue eating between meals. Or possibly, on the other hand, the doughnut will gain a repute as a standby in times of muscular stress and thus retain in peace the unique favor that it won through the efforts of the Salvation Army in the days of military stress.

1. Benedict, Cornelia G., and Benedict, F. G.: Boston M. & S. J. **179**: 153, 1918. Candy and Calories, editorial, J. A. M. A. **72**: 1297 (May 3) 1919.
2. Benedict, Cornelia G., and Benedict, F. G.: The Energy Content of Extra Foods, Boston M. & S. J. **181**: 415 (Oct. 2) 1919.

# Current Comment

## THE COMPLEXITY AND COST OF MODERN DIAGNOSIS

It has frequently been stated that scientific medical diagnosis and treatment are a privilege accorded only to the very poor and the very rich. The recent establishment of diagnostic clinics and diagnostic institutes indicates that the principle of group practice is being recognized to a greater extent than has heretofore been the case. The general hospitals have for many years been diagnostic institutes for group practice, a fact which is sometimes not remembered by those who proclaim that group practice represents a new principle. The diagnostic institute of the present day is, however, not a hospital but an ambulatory clinic, the idea being that many patients who do not care to go to hospitals and who do not need to do so can have their ailments studied at such an institution. A perusal of the charges for service made by some of these institutions indicates that while they have doubtless solved the problem of medical cooperation they have not completely solved the financial problems of the patient. The fee for a general examination is a modest one well within the reach of the average citizen who falls into neither the pauper class nor the group of the wealthy. More complicated examinations, such as are necessary in patients with obscure diseases, cost a sum which in many instances would be quite beyond the means of the average wage-earner. The question of obtaining efficient medical diagnosis and treatment for cases of obscure disease among those who can pay only a modest fee is one of the live questions of the day. It is doubtful whether it can be met by diagnostic clinics unless they are heavily subsidized organizations along the lines of the existing dispensaries, but differing from them in the fact that a small fee is charged. Attempts have been made to meet the situation in this way, but as yet there has been no widespread effort to care for the man of moderate means. As individuals of this group furnish the great bulk of patients, some machinery must be devised which will enable them to receive inexpensive but adequate care when they develop obscure diseases.

## THE POPULATION OF THE WORLD AND THE RATE OF ITS INCREASE

Every so often, sociologists and statisticians begin to "view with alarm" the rapid increase in the world's population and to predict world catastrophe as an inevitable result. Recently the statistician for the commonwealth of Australia, G. H. Knibbs, in a monograph on population,[1] stated some significant facts and estimates in regard to the present and the future population of the earth. Knibbs puts the population of the earth for the year 1914 at 1,649,000,000, or about thirty-nine million in excess of the estimate of Jaraschek, the French statistician, for 1910. The annual rate of increase in the world's population for the five-year period 1906 to 1911 Knibbs estimates at 0.01159, or 1.159 per cent. of the population. Should such a rate of increase be continued, it must result in a severe strain on the resources of Nature. Knibbs asks whether medical men in future will take a stand in favor of so colossal a population that the masses will scarcely be provided with the bare necessaries of life, or will they favor birth control and a limitation of births in such a manner that the population of the earth shall never be greater than can be adequately provided for on a high plane of physical, mental and moral existence?

1. Knibbs, G. H.: Census of the Commonwealth of Australia, Appendix A, The Mathematical Theory of Population, of Its Character and Fluctuations, and of the Factors Which Influence Them, Melbourne, Commonwealth Bureau of Census and Statistics, 1917.

## VACANCIES IN ARMY AND NAVY MEDICAL CORPS

As stated elsewhere, there are 710 vacancies in the regular medical corps of the army and 429 vacancies in the regular medical corps of the navy for young physicians who wish to undertake this work. Under the present law, reserve officers on active duty may be continued on such duty with their consent until July 1, 1920. The departments are also permitted to assign officers for temporary service until that time. For this reason the large vacancy list does not indicate any distress on the part of the service or immediate need of men to fill these positions. However, with the passing of the emergency covered by the law, both services will require young men to fill these positions. The reason for these resignations is of course understood. It is not dissatisfaction with the service but the fact that the increasing cost of living makes the present pay absolutely inadequate. Fortunately, there are now in Congress bills for increased pay to officers of the military service which will permit the corps to offer more attractive opportunities to interested young men, and it is likely that as soon as these bills pass —which they undoubtedly will—numerous young men will wish to avail themselves of the opportunities offered by these permanent positions. Those interested should communicate at once with the Surgeon-General of the Army or Navy, with a view to having on hand complete information so as to carry through the application, examination and appointment with the least possible delay.

## CHANGING POTABILITY OF GROUND WATER SUPPLIES

A recent review by two experienced army officers, who have been specially engaged with problems of the quality of water supplies in the army camps, cantonments and posts in the United States, contains some interesting suggestions for future practice and procedure. The authors, Hyde and Haskins,[1] lay emphasis on the importance of making frequent examinations of ground water supplies. Considerable variability in bacterial quality has been observed in various places, and it is plain that unless a ground water supply can show consistently good quality throughout a considerable period of time, it should be regarded with suspicion and treated accordingly. They also conclude that except under extraordinary circumstances involv-

1. Hyde, C. G., and Haskins, C. A.: Notes on the Water Supplies of Army Camps, Cantonments and Posts in the United States, J. Am. Water Works A. 6: 560, 1919.

ing successful design and construction as well as vigilant and intelligent operation, the effluents of rapid sand filter plants, treating significantly polluted waters, cannot be considered to be uniformly safe and should receive further systematic treatment, as by adequate chlorination. It is noteworthy that the authors consider that all water supplies, from whatever source, should be regarded as potentially unsafe, and that they apparently believe chemical disinfection (chlorination) should be resorted to in many instances. A significant warning for civilian conditions is contained in the paragraph: "An extraordinary inefficiency and lack of intelligence is too frequently to be noted with respect to the operation of rapid sand filter plants, especially those of municipalities, and of these, naturally, the smaller communities in which the authorities do not recognize the value of expert services and the relative economy of the highest skill."

### THE INFLUENZA PHOBIA

The influenza phobia has evidently not been limited entirely to this country: the following is from a recent issue of the *Medical Press and Circular*, London:

> Mostly during the past two months the public have been deluged by would-be prophets predieting that the coming winter will herald another visitation of influenza. It is needless to say that these prognostications have been limited to the lay journals. The prophetic attempt would suggest that the idea is to angle for an honor of a "I told you so" type. Or it may be that the subject fills a gap when "copy" is short. The repeated reiteration of nursery rhyme precautions against chills, exposure to cold and changes in the weather must now be boring the public, should they happen not to be alarmed thereby. The inexpediency of all these warnings and suggestions of woes is that no one knows whether another influenza epidemic will or will not become an accomplished fact. Why, then, should prophets anticipate an evil which, as far as our knowledge goes, may not materialize? Why should the public be kept on tenter-hooks by continually reminding them of something which may never happen? We learnt last week from the *Times* that there had been under treatment some cases of influenza-pneumonia, and naively the remark was added that "So far, happily, there were not many in number," And so the ball is kept rolling to the injury of the public—of those, that is, who fail to recognize that the surest way to precipitate an evil is to become obsessed in the anticipation of it.

There is elemental truth in the last sentence. From the physician's point of view, the influenza phobia leads to the danger that he may call any respiratory complaint seen in the course of his work "influenza." Many health authorities, reviewing the history of previous epidemics, would say that the three to four years following such epidemics were marked by recurrences of a minor character, yet there do not seem to be any reliable statistics to show that there had actually been such recurrences in epidemic form; there appears to have been more pneumonia in the years immediately following the epidemic. And that is all. To be forewarned is to be forearmed, and to be prepared is to be safe; but to be hysterical and to look for trouble is to invite catastrophe.

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**Industrial Nursing.**—The trained nurse probably first entered industry in 1895, when the Vermont Marble Company engaged a nurse to visit the homes and care for the sick workers and their families.—Florence S. Wright.

## *Medical News*

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION, PUBLIC HEALTH, ETC.)

### CALIFORNIA

**Personal.**—Dr. William R. Molony, Los Angeles, has been appointed a member of the State Board of Medical Examiners.

**New Home for Nurses.**—A new home for nurses at the Agnew Sanatorium, consisting of two large residences near the hospital annex with a bridge connection, was ready for occupancy, November 1.

**Restoration of License Refused.**—Dr. George H. Richardson of Los Angeles is reported to have been unsuccessful in securing the restoration of his license which was revoked several months ago for unprofessional conduct.

**Hospital for Women Abandoned.**—The Mission Valley Hospital for Women, San Diego, was abandoned following a recommendation to the city council of the state health officer. Under the new plans the city health board will have all cases of venereal disease treated at the general clinic.

**Rehearing Denied.**—It is reported that the California State Board of Medical Examiners denied Dr. Gideon M. Freeman of Los Angeles the privilege of a rehearing. Freeman's license was revoked following his conviction in Los Angeles on a charge of using the mails to defraud, when he was fined $1,500.

**Stanford Clinic to Study Mental Diseases.**—A clinic for the study of retardation and degeneration among children will be opened for advanced students of psychology at Stanford University in cooperation with the Good Cheer Club at San Jose, under the direction of Dr. G. C. Bassett. Subjects for study will be found in the Juvenile Court of San Jose.

**Physicians' Licenses Revoked.**—According to newspaper reports, the California State Board of Medical Examiners recently revoked the license of John Lafayette Berry, known as "Bloodless" Berry of Los Angeles and Modesto, for using a name other than his own.——The license of Dr. R. May Minaker, San Francisco, it is reported, was also revoked on the charge of performing a criminal operation which resulted in the death of the patient.

### FLORIDA

**Personal.**—Dr. Samuel D. W. Light, acting quarantine inspector for Key West, was severely injured, October 25, by falling through a hatchway on the U. S. S. *Sialia*. Dr. Joseph Y. Porter, Sr., Key West, has taken over the duties of quarantine inspector until Dr. Light recovers.

**Examination of Schoolchildren.**—The state board of health, November 1, completed the examination of 9,000 schoolchildren in Escambia County. It was developed by the examination that trachoma and hookworm are considerably more prevalent among white than among negro children.

**Ambulatory Venereal Disease Clinic.**—The Florida State Board of Health has established an ambulatory clinic for the treatment of venereal disease, which went into operation the first week in November, under the charge of Dr. Daniel C. Campbell, Marianna, who will accompany it to all of the rural districts and labor centers in the state. In addition to giving treatment, Dr. Campbell will conduct an educational campaign against venereal disease.

### ILLINOIS

**Schools Closed by Diphtheria.**—The Granite City public schools were ordered closed indefinitely, October 27, as the result of the discovery of twenty-one cases of diphtheria and scarlet fever among the pupils.

**Personal.**—Dr. Carl E. Black, Jacksonville, has returned from Greece, and has resumed his work with the Professional Committee for medicine, connected with the Department of Registration and Education, succeeding Dr. Jonathan L. Wiggins, East St. Louis.

**Illegal Practitioners Fined.**—It has been reported that the Illinois Department of Registration and Education arrested P. J. Krackowski of 2339 West Twenty-First Street, Chi-

cago, and W. A. McLeod, a mechanotherapist of Joliet, for practicing medicine without a license. They were both fined $25 and costs, and Krackowski was placed on parole for one year.——Dr. Berry S. Henderson, Quincy, whose license was revoked a few months ago by the Illinois Department of Registration and Education for unprofessional conduct, was found to be practicing medicine in Decatur. On being arrested for practicing medicine without a license he plead guilty and was fined $75. State's Attorney Deck of Macon County was very active in the prosecution. Henderson agreed that if Mr. Deck did not recommend the maximum fine, he would never again practice medicine in Illinois unless he secured another bona fide license.——Andrew Henry, a chiropractor at Peoria, was also arrested by the Illinois Department of Registration and Education for practicing without a license and was fined $25 and costs. Henry told the court he was going to leave Illinois.——A. Scott of Peoria, who styles himself "Dr." A. Scott, paid a fine of $100 and costs for practicing medicine without a license. Scott asserted that since he is an Indian, he did not need a license to practice in Illinois. This is the second time Scott has paid a fine within the last year. He has now taken down his sign and says he will quit business.——Albert G. Dellenbaugh of 855 Oakwood Boulevard, Chicago, plead guilty to an information filed against him in the Municipal Court in Chicago by the Department of Registration and Education of Illinois and was fined $25 and costs for violating the medical practice act. The records of the department at Springfield show that, in 1918, Dellenbaugh was arrested for writing a number of prescriptions as a physician which were filled at a drug store. The records also show that Dellenbaugh was arrested in San Antonio, Texas, in 1913, for violating the Texas Medical Practice Act and that he was fined $50 and costs and was confined one day in jail. Furthermore, they show that Dellenbaugh was arrested for forgery in Boston, in 1909, for signing the name of a Dr. Gill to a death certificate.

### Chicago

**Midwife Held for Abortion.**—Mrs. M. P. Urbanas, a midwife, is said to have been arrested recently and put in jail charged with performing an illegal operation.

**Professor McCollum to Address Institute of Medicine.**—At the meeting of the Institute of Medicine of Chicago, Nov. 25, 1919, at 8 o'clock, in the City Club, Prof. E. V. McCollum, Baltimore, will speak on "The Fundamental Principles Underlying Modern Nutrition Investigations." All interested are invited.

**Personal.**—Dr. Clarence W. Leigh was reappointed city physician by the mayor, November 10.——Dr. William Arthur Clark, formerly a member of the staff of St. Luke's Hospital, has been discharged from the army and has left Chicago to work in the department of orthopedic surgery at the Mayo Clinic, Rochester, Minn.

**Physicians Named in Drug Trial.**—Drs. A. F. Zwich, Joseph E. King, Frank A. Butler, Harlon H. Gordan, Charles W. Wren and Wesley E. Burnett are said to have been arrested, charged with prescribing habit-forming drugs to drug addicts. One of these defendants is said to have issued 3,000 prescriptions for morphin and its derivatives.

**Wesley Hospital Adopts Insignia for Staff.**—The Wesley Memorial Hospital has adopted a key to be worn by members of the resident staff who have completed a satisfactory term of service. Former Wesley interns who completed one year of service with honorable record may secure keys on application to the superintendent or to Dr. D. W. Propst.

**Traveling Clinic.**—The Chicago Tuberculosis Institution has already one traveling clinic and hopes, through the sale of Red Cross Christmas Seals, to secure sufficient funds to purchase a second automobile. The car is a completely equipped clinic which travels a regular route through the county towns. It is to be accompanied by a physician and a nurse.

## INDIANA

**Osteopath Sues Hospital.**—Kent S. Seaman, an osteopath of Fort Wayne, has filed suit for $50,000 against the staff of St. Joseph's Hospital, Fort Wayne, alleging that his business has been greatly damaged because osteopaths and chiropractors have been barred from St. Joseph's and other local hospitals.

**Hospital Items.**—A maternity hospital, with a department for the feeding and care of infants, will be established at the Florence Crittenton Home, Indianapolis. There is no home of this sort nearer than Chicago or Detroit and the need is urgent. The hospital will have 150 beds and the work of caring for babies will be in the hands of the trained nurses and nurses' aides. Most of the $100,000 necessary has been pledged and a drive will soon be started for the remainder.

**Personal.**—Dr. Venice D. Keiser, Indianapolis, has been appointed pathologist to the Peoples Hospital, Akron, Ohio.——Dr. Howard W. Burkley, Logansport, assistant medical examiner for the Pennsylvania System at Logansport, has been appointed medical examiner for the system at Alliance, Ohio, and has been succeeded by Dr. Harry M. Shultz.——Dr. Fleetwood H. Sale, Dillsboro, after practicing medicine in the community for more than thirty years, has retired.——Dr. Samuel E. Smith, superintendent of East Haven Hospital, Richmond, has been elected vice president of the board of trustees of the Indiana University.

**The Teaching of Health and Hygiene in Public Schools.**—The state board of education has recommended "That health and hygiene be taught in Indiana public schools, whenever and wherever, in the judgment of the school officers, the advancement of the pupils require it and when conditions generally justify." These subjects are to be taught by a regularly licensed teacher, and no person shall be eligible to take the examination or to be licensed in the state, who is not a high school graduate and a registered nurse in the state of Indiana. The license when issued will entitle the holder to supervise and teach hygiene and health in both elementary and high schools in the state.

## KENTUCKY

**Personal.**—Dr. Frederic G. Larue, superintendent of the Western State Hospital, Hopkinsville, is reported to be seriously ill with kidney disease in the Riverside Hospital, Paducah.

**New State Officers.**—The annual meeting of the Kentucky State Medical Association, convened in Ashland, September 22, under the presidency of Dr. James S. Lock, Barbourville, and Dr. John G. South, Frankfort, was installed as president. The following officers were elected: president-elect, Dr. William W. Anderson, Newport; vice presidents, Drs. Porter C. Layne, Ashland, Irvin Lindenberger, Louisville, and Daniel J. Travis, Eddyville.

**Old Member Honored.**—At the meeting of the Franklin County Medical Society, held in Frankfort, November 4, Dr. Urbane V. Williams, Frankfort, who recently celebrated his eighty-sixth birthday anniversary, was the guest of honor. Dr. Williams entertained the society with reminiscences and paid a tribute to his boyhood friend, the late Dr. William Bailey, Louisville.

## MARYLAND

**Conference of Mental Hygiene Society of Maryland.**—The annual conference of the Mental Hygiene Society of Maryland was held, November 19 and 20, in Osler Hall, Baltimore. The general subject under discussion was "Modern Psychology Applied in the Classroom." Dr. Agnes Rogers, head of the department of education, Goucher College, spoke on the evening of the 19th on "The Message of Educational Psychology to Parents and Teachers"; the address was followed by a general discussion opened by Dr. Adolf Meyer, Baltimore, head of the department of psychiatry, Johns Hopkins Hospital. On the second day, Dr. William Kilpatrick, professor of education, Teachers' College, Columbia University, delivered an address on "Learning Through Purposeful Activity."

**New Hospital for Montgomery County.**—The new Montgomery County General Hospital, located near Olney, is nearing completion and will be formally opened on Thanksgiving Day. It will be ready to receive patients by December 15. The building, equipment and grounds, comprising about 12 acres, will cost about $50,000, and nothing has been spared to make the institution one of the most complete and up-to-date hospitals to be found in the country. There will be accommodations for thirty-five patients. A nurses' home with accommodations for seven persons adjoins the hospital. The enterprise is the outgrowth and development of a small establishment known as the Wrenwood Hospital, between Ashton and Brighton, which was started Jan. 1, 1916, in a private dwelling.

## MASSACHUSETTS

**Conservation of Vision.**—At the recent session of the state legislature, $10,000 a year was appropriated for the use of the Massachusetts Commission for the Blind for the purpose of procuring adequate equipment for classes on conservation of vision, already in existence, and establishing new

classes for children on the waiting list. The commission plans to open classes in Revere, Somerville, Waltham, Watertown, Chelsea and Newton. Miss Marion Campbell has been engaged to take up industrial art work in Massachusetts in the near future.

**Boylston Medical Prize.**—The Boylston Medical Committee appointed by the president and fellows of Harvard College and consisting of Dr. William F. Whitney, chairman, Dr. Harold C. Ernst, Harvard Medical School, Boston, secretary, and Drs. William T. Porter, Edward H. Nichols, Reid Hunt, Henry A. Christian, and John Warren, announces that at the annual meeting, held in Boston, in 1916, a prize of $300 was awarded for an essay entitled "Studies of the Streptococcus of Smith," by Dr. Wilson G. Smillie, Cambridge, Mass. For 1919 there is offered a prize of $300 together with the Boylston Prize Medal, for the best dissertation on the results of original research in medicine, the subject to be chosen by the writer. The medal will be added to the money prize only in case the winning essay shows special originality in the investigations detailed. Essays entered for this prize must be in the hands of the secretary on or before December 31. Each paper must be printed or typewritten, bound in book form, and must bear, in place of the author's name, some sentence or device, and must be accompanied by a sealed packet, bearing the same sentence or device and containing within the author's name and residence. Preference will be given to theses which exhibit original work, but if no dissertation is considered worthy of the prize, the award may be withheld.

## NEW YORK

**Otisville Hospital Closes.**—United States General Hospital No. 8, Otisville, ceased functioning as a hospital, November 15.

**Personal.**—Dr. John A. Herring, a member of the staff of the Metropolitan Life Insurance Sanatorium, Mt. McGregor, for two years, has accepted a position on the medical staff of the students' health board of Cornell University, Ithaca. ——Dr. Gedney Jenks, Hastings-Upon-Hudson, has just opened a hospital.

### New York City

**New York University Admits Women to Medical School.**—For the first time in its history the New York University Medical College has enrolled twenty women on its roster of students. These women will have equal privileges with the men, attending the same classes, and working in the same laboratories and clinics.

**Personal.**—Dr. Otto V. Huffman, Brooklyn, has been appointed a member of the consulting staff of the North Westchester Hospital, Mt. Kisco.——Mr. James Arnold DeVeer has been appointed clinical pathologist for Long Island Hospital.——Dr. Frederick Tilney, Brooklyn, has been made consulting neurologist to the Mountainside Hospital, Montclair, N. J.

**Hospital Consolidation as Educational Aid.**—The New York Association for Medical Education has evolved plans for consolidating the interests of hospitals, including those controlled by the city, with a view to making their facilities available in accordance with the purposes of the organization to extend the opportunities for medical education in this city. The present plan includes a proposal to raise $12,000,000 to $15,000,000.

**Large Fund for Mount Sinai Hospital.**—The Guggenheim brothers, Daniel, Murry, Isaac, Simon and Solomon, have given $250,000 more to Mount Sinai Hospital. This makes a total of $600,000 which they have contributed to a new pavilion which is to be a memorial to the parents of the donors. The plans for this new pavilion, which will cover the entire block on Fifth Avenue between Ninety-Ninth and 100th streets, have been drawn, and work will be begun early next spring. When completed the new structure will represent an outlay of $1,000,000. It will provide accommodations for 130 patients in private rooms.

**Health Department to Demonstrate Schick Test.**—The *Weekly Bulletin* of the New York Department of Health announces that the bureau of preventable diseases will conduct demonstrations of the technic of the Schick test, and its interpretation, for the benefit of all private physicians who may desire to become acquainted with the application of this test. Medical officers attached to each of the clinics of the bureau have been specially instructed in the method of performing the test and interpreting the reaction, and are prepared to give the benefit of their knowledge to any physician who will visit the clinics between 2 and 4 p. m.

## PENNSYLVANIA

**Personal.**—Dr. Raleigh R. Huggins, Pittsburgh, has been appointed professor of gynecology in the School of Medicine of the University of Pittsburgh, succeeding Dr. Xavier O. Werder, resigned.——Dr. Walter W. Seibert, Easton, has been appointed a trustee of the Rittersville State Hospital.

**Tri-Borough Dispensary for Tuberculosis.**—A tuberculosis dispensary under the supervision of the state health department will be established in the Citizen's General Hospital, North Kensington, as soon as that institution is ready to receive patients. It is expected that forty or fifty patients will be sent to the dispensary immediately after the opening, and that cases will be transferred from the Allegheny Valley General Hospital, Tarentum, where a dispensary is already in operation. Applications for admission to the state sanatoriums will be made through the dispensary.

### Philadelphia

**Red Cross Base Hospital.**—A base hospital costing approximately $50,000 will be established in this city by the Southeastern Pennsylvania Chapter of the American Red Cross. The hospital will be paid for by memberships obtained in the annual Red Cross Roll Call, which ended on Armistice Day, November 11. The new building will be complete in every detail, and will be so conducted as to be available for use in the event of a great catastrophe or any other emergency. According to Howard Wayne Smith, executive secretary of the Southeastern Chapter, the proposed institution already has been accepted by the city.

**Personal.**—Dr. Samuel T. Orton has been appointed superintendent of the new psychologic hospital connected with the State University of Iowa, Iowa City, which has recently been erected at a cost of $175,000.——Dr. Alonzo E. Taylor, Rush Professor of physiological chemistry in the University of Pennsylvania, will deliver the annual Gross lecture of the Pathological Society of Philadelphia, November 20, instead of November 13, in Thompson Hall, College of Physicians Building.——Dr. Allen Jackson, chief resident physician at the Philadelphia Hospital for the Insane, was elected superintendent of the Danville State Hospital for the Insane. He will enter on his duties, January 15, and will succeed Dr. Hugh B. Meredith who has been superintendent of the hospital for twenty-eight years.

## RHODE ISLAND

**Endorse Hospital Project.**—Following a general discussion of the subject "Should the Pawtucket Valley Have a Hospital," Kent County Medical Society at a regular meeting, formally endorsed and adopted a resolution approving the project.

**Welcome to Service Men.**—The medical profession of this state united in tendering a complimentary dinner on Armistice Day to the members of the profession who were in the medical service of the army and navy during the great war. About 250 persons were present and it was said to be the largest meeting of medical men ever held in this state. Of the 168 men in the service, 109 were present. There were also three of the four surviving physicians who served in the civil war. The dinner was enlivened by the singing of songs and at its close the men were given an enthusiastic welcome by a few medical and lay speakers. After this there was a varied entertainment including songs, a moving picture show and a boxing match. Dr. John M. Peters, Providence, president of the Rhode Island Medical Society, presided.——Kent County Medical Society held a banquet and reception at the Hotel Updike, October 22, in honor of Fenwick G. Taggart, Major, M. C., U. S. Army, East Greenwich, who recently returned from overseas.

## TEXAS

**New Society Organized.**—The Ranger Medical Society was organized at Ranger, November 4. Dr. Cabel O. Terrell, Ranger, was elected president; Dr. Austin K Weir, Staff, vice president; Dr. Carl S. Wilson, Ranger, secretary, and Dr. Brutus C. Rutherford, Ranger, treasurer.

**Prevention of Blindness.**—Under the auspices of the state board of health, the field secretary of the National Committee for the Prevention of Blindness gave a series of illustrated lectures in the schools and colleges and before general audiences in thirty of the leading cities of the state, during October.

## WISCONSIN

**Another Case of Leprosy Discovered.**—The second case of leprosy to be reported in Wisconsin was reported by Dr. Cornelius A. Harper, Madison, state health commissioner, October 16, who inquired about hospital care in Milwaukee for the second victim, Andrew Anderson, a farmer living with his wife near Cambridge. This case is said to be of the contagious type.

**Personal.**—Dr. Corwin A. Freeman, South Milwaukee, was operated on for the removal of gallstones, at Trinity Hospital, Milwaukee, and is reported to be doing well.——Dr. Alfred W. Wilmarth, Chippewa Falls, superintendent of the State Home for Feebleminded for twenty-two years, has resigned.——Dr. John E. English, Baraboo, is reported to be critically ill. —— Dr. Harry Cohn, Wauwatosa, who resigned as associate medical director of the Muirdale Sanitarium to become director of the new Milwaukee County Dispensary, was given a farewell party and presented with a loving cup by Muirdale patients and employees, October 1.

## CANADA

**Degrees Conferred.**—At a recent convocation celebrating the founding of Dalhousie University, Halifax, N. S., two medical men of that city were presented for the degree of Doctor of Laws: Drs. John Stewart and Murdoch Chisholm.

**Smallpox Outbreak.**—Toronto is experiencing a considerable outbreak of smallpox. There are at present more than 300 cases reported and about 1,000 contacts quarantined. The disease is of a mild form. There are several other centers in the province of Ontario, notably Woodstock and Stratford. Unvaccinated and those with unsatisfactory vaccination scars are being rapidly vaccinated.——The province of Quebec is also experiencing some alarm over smallpox, there being about 300 cases in that province.

**Code of Ethics for Ontario.**—Following on the suggestions of Dr. Edmund E. King, Toronto, president of the Academy, a code of ethics is being framed for the profession in Toronto. Copies of the pamphlets of Ethics of the American Medical Association were handed around, and certain suggestions for alteration to meet local conditions were suggested and are likely to be adopted.——The Workmen's Compensation Act, the New Ontario Medical Act, and the Ontario Temperance Act will likely be discussed at future meetings.

**Hospital News.**—St. Luke's Hospital, Ottawa, will share in an exceedingly generous bequest from a late citizen of Ottawa. The amount will reach about $500,000; and the Lady Grey Hospital, Ottawa, receives a legacy, from the same estate, of $2,000.——The orthopedic and surgical appliances branch of the department of Soldiers' Civil Re-Establishment have depots scattered throughout Canada where disabled men can receive immediate treatment and attention. Canada sent representatives to the recent conference in New York City to discuss the best means and methods of overcoming the handicap of war as represented in maimed and wounded soldiers.

**Health Conference.**—There was held recently in Hull, Que., the Public Health Service Convention. It was largely attended by medical men from the province of Quebec and some from adjoining vicinities in Ontario. Dr. John A. Amyot, Toronto, deputy minister of public health for Canada, was present, and spoke of the functions of the new federal department of health. Dr. J. G. Urgel Archambault, Hull, Que., was elected president, and Dr. Joseph G. de Varennes, Quebec, secretary There are 1,200 municipalities in the province of Quebec that should have a board of health, and the medical officer of health of each board should be required to attend every annual convention of the health services.

## GENERAL

**Tri-State Physicians Meet.**—At the annual meeting of the Northern Tri-State Medical Association, held in Kalamazoo, Mich., November 5, Dr. Charles C. Terry, South Bend, Ind., was elected president; Dr. Louis A. Miller, Toledo, Ohio, vice president; Dr. George W. Spohn, Elkhart, Ind., secretary, and Dr. Joseph A. Weitz, Montpelier, Ohio, treasurer.

**Request for Trephined Stammerer.**—An investigator on stammering desires, if possible, to secure a stammerer whose skull has been trephined in order that direct observation may be made as to whether cerebral congestion accompanies stammering. If such a subject comes to the attention of a physician, THE JOURNAL will be glad to communicate the name and address of the inquirer.

**Ohio Valley Physicians Meet.**—At the twentieth annual meeting of the Ohio Valley Medical Association, held in Evansville, November 11 and 12, Evansville was selected as the place of meeting for next year, and the following officers were elected: president, Dr. Virgil H. Moon, Indianapolis; vice presidents, Drs. Charles T. Souther, Cincinnati, Louis Wine Bremerman, Chicago, and Sidney J. Eichel, Evansville, Ind., and secretary-treasurer, Dr. Benjamin L. W. Floyd, Evansville, who has held that position since the organization of the society.

**Legislation to Promote Physical Training of Women.**—The physical development of women is the chief aim of a bill introduced by Senator George W. Chamberlain of Oregon. The measure authorizes the War Department to grant the use of land and camp equipment to the United States Training Corps for Women and details officers at certain camps for their instruction in military training. The camp sites and equipment would be loaned by the government free of charge, under such terms as would protect the best interests of the government. It is understood that the measure has the approval of the United States Public Health Service.

**Prevention of Blindness.**—The annual meeting of the National Committee for the Prevention of Blindness, Inc., will be held November 25 at 4:30 p. m., in the south hall of the Russell Sage Building, 130 East Twenty-Second Street, New York City. Hon. William Fellowes Morgan will preside and the annual address will be given by Dr. Thomas D. Wood, New York City, chairman of the Joint Committee on Health Problems in Education of the National Council of the National Education Association and of the American Medical Association. Mrs. Winifred Hathaway, secretary of the National Committee for the Prevention of Blindness, will present the subject of "Conservation of Vision Classes in Public and Private Schools," giving lantern slide demonstrations.

**Legislation for Rural Health Work.**—A bill providing for the cooperation of the federal government with the state governments in the promotion of "rural health work" has been introduced in the House of Representatives by Congressman Mann of South Carolina. The measure would provide "methods and means for the prevention, control, and mitigation of the diseases of the people of rural districts of the United States, including towns in such districts having a population of not more than 5,000, as shown by the latest available census." The work would be carried on by the division of public hygiene, which would be established in the United States Public Health Service, and which would cooperate with the department of agriculture. Appropriations on a sliding scale for the work are provided for until June 30, 1921, after which the sum of $1,000,000 a year would be made available, annually. Other similar measures are pending, the chief differences being that the other measures place the work under the department of labor. The measure is H R. 10510 and has been referred to the house committee on agriculture.

**Vocational Rehabilitation.**—In the Smith-Bankhead bill which has just passed both houses of Congress, vocational rehabilitation, similar to that now in operation for disabled soldiers and sailors, is provided for "persons disabled in industry or otherwise." The bill provides $1,000,000 yearly to enlarge the original Smith-Hughes act which created the federal board for vocational education and its recent extension to cover war cripples, so as to assure the maimed victims of industrial accidents also the opportunity for vocational retraining into skilled occupations suitable to their physical powers, and restoration to useful self-sustaining jobs. It is stated that there are at present more than 100,000 permanently incapacitated workers in the United States and this army of casualties is being increased at a rate of 11,500 every year. Under the bill the individual states must provide at least $1 on behalf of their own crippled workers, for every dollar expended by the federal government. Several states have already taken favorable action in anticipation of the congressional cooperation now assured in the bill.

**Bequests and Donations.**—The following bequests and donations have recently been announced:

St. Luke's and Sacred Heart hospitals, Spokane, Wash., each $18,000, by the will of W. Earhart, Spokane.

Mt. Sinai Hospital, New York City, $5,000, to found a bed in memory of his father; Montefiore Home, and Home for Aged and Infirm Hebrews, each $500, by the will of Louis J. Weil.

New York Nursery and Child Hospital, $200,000; General Memorial Hospital, New York City, $50,000, by the will of Mrs. Margaret E. Zimmerman.

Congo and Brazilian Missions of the Presbyterian Church, each $3,000; Hospital for Consumptives of Maryland, $5,000, by the will of Robert T. Wilson, Baltimore.

Medical Society of the District of Columbia, the remainder of the estate after a bequest of $500 has been paid, to be used for the construction of the new building of the society, "it being understood, that a proper memorial to me is placed in same," by the will of Henry Morris Husband, Washington, D. C.

St. Luke's Hospital, Philadelphia, a donation of $40,000 from Charles M. Schwab, to be used to pay the newly built Liberty ward. A gift of $5,000 to the memorial fund in memory of James Z. Haydon, one of the charter members of the board of trustees.

Dr. William G. Doran, New York City, a bequest of $25,000, by the will of Mrs. Margaret A. Howard.

**Sale of Surplus Dental Outfits by the War Department.**—The House of Representatives, Wednesday, November 5, adopted Joint Resolution 222, directing the Secretary of War to dispose of surplus dental outfits in the hands of the Medical Department of the Army, providing that not more than one outfit shall be sold at private sale to any one person and that they shall be sold preferentially to honorably discharged dental officers. The discussion showed that at the beginning of the war with Germany, there were eighty-six commissioned dental officers in the Dental Corps. At the time of the signing of the armistice, one year ago, there were 5,000 commissioned dental officers, 3,000 on duty in the United States and 2,000 abroad. Four thousand dental officers have been discharged from the service in the last year. The government now owns about 6,000 dental outfits, only 1,000 of which are required or in active use at present, the remaining 5,000 outfits being in storage. An army of 350,000 men, such as is proposed by pending bills, would require 700 dental officers and would not need more than 1,000 dental outfits. There is a scarcity of dental instruments and supplies and many of the discharged dental officers are unable to secure satisfactory outfits for civil practice. During the discussion, Dr. C. R. Layton, congressman at large from Delaware, said, ". . . I shall introduce another resolution relating to the disposition of vast quantities of medical and surgical supplies, including all sorts of surgical instruments and appliances now held by the government far beyond its needs. There are millions upon millions of cotton gauze bandages, for instance, held in storage by the government which now retail for from 15 to 30 cents, the prewar price of which was 5 cents. They should be disposed of for the benefit of the whole people. I find that the chairman of the committee on military affairs has a bill dealing with supplies, and when that bill comes before the House I wish to oppose it. In addition to dental outfits, there is a vast amount of supplies of all kinds that are required in hospital and civilian practice that are needed in this country for the benefit of our people. I am opposed to a bill which, I understand, will be presented whereby all this vast material will be handed over to the Red Cross solely for use in foreign countries. . . . The medical profession of the United States today needs these supplies here in America. . . . To take those supplies out of the country instead of giving them to hospitals and other institutions and then to those engaged in private practice in my judgment is neglecting our first duty." In reply to a question from Mr. Kitchin, as to why medical and surgical supplies were not included in the resolution, Mr. Kahn of California, the chairman of the committee on military affairs, said, "I understand that there has been no request made by the doctors for the sale of surgical supplies. The War Department has sent to the committee on military affairs a bill asking that surplus medical supplies be turned over to the Red Cross." Mr. MacGregor of New York asked for information regarding $100,000,000 worth of medical supplies that had been given to the Red Cross by the War Department. Mr. Kahn replied that this concerned supplies in Europe and that they had been turned over to the Red Cross under an Act by Congress since the armistice. Mr. Kitchin endeavored to amend the resolution to include the sale of surgical instruments to physicians, but the amendment was ruled out of order and the resolution was adopted.

## FOREIGN

**Mme. Curie Returns to Warsaw.**—Some of our European exchanges state that Mme. Curie has returned to her natal city, Warsaw, to assume the chair of radiology in the university there.

**Chair of Radiology.**—Prof. M. Ponzo, secretary of the Italian Radiologic Society, has been appealing through the columns of the *Riforma Medica* to the authorities to found chairs of radiology in the universities.

**Deaths in the Profession Abroad.**—Dr. **O J. Engström,** professor of gynecology at the University of Helsingfors, aged 66.——Dr. **C. H. Hildebrand,** professor of children's diseases at the University of Lund, aged 68.——Dr. **R. Wurtz,** *agrégé* professor at the University of Paris.

**Italian Colonial Institute for Hygiene and Biology.**—An institute with this name has just been organized at Naples by the initiative of Profs. I. Bandi and Franceschelli, in connection with the Oriental Institute. There is a fine museum, and five traveling scholarships have been founded in cooperation with the Pasteur Institutes in Tunis and Algeria.

**Interallied Conference on the War Disabled.**—The third conference of this kind has just been held at Rome. The preceding ones were at Paris and London; the permanent seat of the commission is at Paris. Prof. Riccardo Galeazzi was in charge of the arrangements, and an instructive exposition of prostheses, of training methods and of men at work formed an annex to the conference. This exhibition is to be kept open for two months. The next conference is to be held at Brussels, and the *Policlinico* states that Professor Galeazzi was elected president of the permanent committee, which aims to study ways and means for "uncrippling the war cripples," and to disseminate promptly any improvements realized anywhere.

**Italian Surgical Congress.**—The Twenty-Sixth Congress of the Società Italiana di Chirurgia convened in October at Trieste, with Professor Nicolich of Trieste in the chair, as Senator and Professor Durante, the president, was unable to be present on account of sickness. One of the vice presidents, Professor Grossich, of tincture of iodin fame, was also unable to attend, as he is president of the Consiglio nazionale of Fiume, and was detained at home. The society has held no meetings during the war, and this reunion was notable for many reasons, historical as well as scientific. The subjects appointed for discussion were war wounds of the peripheral nervous system, to be introduced by Professor Verga, and motor plastic amputations and prostheses, to be introduced by Professors Galeazzi and Putti.

**Italian Congress of Internists.**—The Twenty-Fifth Italian Congress of Internal Medicine followed the surgical congress at Trieste in the first week of October, with Senator and Professor Maragliano in the chair, and a large gathering of the leading internists of the country. In both these meetings the authorities, local and national, paid exalted tribute to the indefatigable devotion of the surgeons and internists during the years of warfare. The work of the Italian Red Cross was extolled in particular, and also the work of the women physicians during the war. A steamer in the bay was fitted up to offer hospitality to the visiting physicians. This use of a steamer for the congress members was also a feature of the recent meeting at Bilbao, Spain, of the Spanish Association for the Advancement of Science.

**Serologic Institutes in the Netherlands.**—The state has taken over Professor Spronck's bacteriotherapeutic institute at Utrecht in order to insure the continuance of this institution which has done such good service for twenty-five years. It will henceforth be known as the National Serologic Institute, and will continue its work in the preparation of vaccines and antiserums and the teaching of serology. Professor Spronck has been appointed director, and he has petitioned to be relieved from his courses on general pathology and pathologic anatomy in order to devote all his energies to teaching serology. Another professor is to be appointed to the chair of pathology. The Utrecht institute is in charge of the labor department of the government, while the similar institute at Rotterdam belongs to the department of agriculture and commerce, and is designed for veterinary purposes only.

**New Fellows of the Royal College of Surgeons.**—The following have accepted the honorary fellowship of the Royal College of Surgeons of Edinburgh, awarded in connection with the termination of the war, 1914-1918:

British Empire.—Sir William Norman, K.C.B., R.N., late Director-General, Naval Medical Department; Sir Robert Hill, K.C.M.G., C.B., C.V.O., Director-General, Naval Medical Department; Lieut.-Gen. Sir T. H. John Goodwin, K.C.B., C.M.G., D.S.O., K.H.S., Director-General, Army Medical Department; The Hon. Major-Gen. William Rice Edwards, C.B., C.M.G., K.H.P., M.D., Director-General, Indian Medical Service; Major-Gen. G. L. Foster, C.B., Direcor-General, Medical Services, Overseas Military Forces of Canada; Major-Gen. Sir N. R. Howse, V.C., K.C.B., Director, Australian Army Medical Service; Col. W. H. Parkes, C.M.G., C.B.E., Director, New Zealand Medical Corps; Col. P. G. Stock, C.B., Director, South African Medical Corps.

Allies.—Rear-Admiral William C. Braisted, U. S. N., Administrative Head of the Medical Service of the United States Navy; Surg.-Gen. Merritt W. Ireland, United States Army Medical Corps. Medicine

Inspecteur-General Sieur, Member of the French Academy of Medicine and Professor of the Val-de-Grace Military Hospital. Lieut.-Gen. Leopold Melis, K.C.B., Inspecteur-General du Service de Sante de l'Armee Belge, attache a la Maison du Roi. Maggiore Generale Commendatore Lorenzo Buonomo, Attache to the Ispettorato di Sanita Militare, Rome. Surgeon-Director-General Professor Tadao Honda, Director-General Naval Medical Service (Japan).

**Pediatrists' Congress of the Northland.**—The First Nordiske Congress for Pediatrics was held at Copenhagen in August, with Prof. C. E. Bloch of Copenhagen in the chair. In his opening address he said that the desire to hold an independent meeting of pediatrists was not because they wished to pull apart from internal medicine, but pediatrics now is more than a mere subsection of internal medicine, the study of the growing organism under normal and pathologic conditions is such a vast field in itself. The first subject on the order of the day, the etiology and classification of acute digestive disturbances in artificially fed children, elicited a lively discussion with opposing views, some advocating the French classification and others the Finkelstein. The importance of infection as the factor versus the food elicited much discussion, as also the treatment of acute digestive disturbances, and of infantile tetany. A number of experiences were related showing the effects of war deprivations on children and how they were combated. The Nordisk Pediatric Association was then formally founded, with three representatives on the board from each of the Scandinavian countries, Pipping, Løvegren and Sourander representing Finland; Johannesen, Looft and Collet, Norway; Jundell, Wernstedt and Lichtenstein, Sweden, and Bloch, Monrad, A. Meyer and C. Friderichsen, Denmark. The next congress is to be held at Stockholm in 1921. The meeting was attended by 25 pediatrists from Sweden, 16 from Norway, 7 from Finland and 34 from Denmark.

## LATIN AMERICA

**Dr. Vaz Appointed to Chair.**—Dr. Juvenil da Rocha Vaz has been appointed professor (*substituto*) of clinical medicine at the University of Rio de Janeiro.

**Physician Appointed Head of the National Education Board in Cuba.**—Dr. Gonzalo Aróstegui has been appointed by the president of the republic of Cuba secretario de instruccion pública y bellas artes, succeeding Dr. Dominguez Roldán.

**Organization of Puebla Academy of Medicine.**—On the initiative of Dr. A. Cabrera, who is governor of the state of Puebla, Mexico, thirty-three physicians of Puebla recently organized the Academia de Medicina de Puebla. They at once appointed a committee for collaborating in the research on typhus which has been inaugurated by the medical organizations of the City of Mexico. The officers elected include Dr. M. Vergara, president; Dr. F. Bello, vice president, and Drs. G. Vergara and P. Soto, secretaries.

**Yellow Fever on War Ship.**—Two cases of yellow fever on board the U. S. S. *Chicago*, both resulting in recovery, have been reported to the bureau of medicine and surgery of the navy department. The cases occurred during an outbreak of yellow fever at Amapala, Honduras, and the medical officer reports that in one of these cases the first treatment of antileptospira icteroid serum of Noguchi ever given to man was administered. The serum apparently had a very happy effect on the patient and seemed to turn a bad prognosis into a convalescence in his case.

**New Quarantine Station in Central America.**—The sanitary authorities of Honduras and El Salvador with a view of preventing the introduction of plague, cholera, yellow fever, etc., have recommended to the respective governments the establishment of an international quarantine station on one of the islands of the Gulf of Fonseca, to be administered jointly by both governments, with the government of Nicaragua joining if it so desires. Major-General William C. Gorgas has just completed a trip of inspection through El Salvador in connection with the recent occurrence of yellow fever in Nicaragua. He was accompanied in his trip by Dr. T. C. Lyster of the Rockefeller Foundation and Dr. W. Pareja of El Ecuador.

## CORRECTION

**Ragweed Dermatitis.**—In the article of Dr. Richard L. Sutton, in THE JOURNAL, November 8, under Figure 2, the legend reads: "Giant ragweed replaces the common ragweed in most parts of the Eastern and Southern States." This should read in "moist parts."

# *Government Services*

### Personnel of the Medical Department

For the week ending November 14, there were in the Medical Corps 2,318 officers on duty out of a total of 30,591, the maximum number on duty Nov. 15, 1918; the Medical Reserve Corps contained 3,789 officers, an increase of fifty-two from the previous week.

### Personal

Frederick F. Russell, Col., M. C., U. S. Army, has been designated as official representative of the Medical Department of the Army in the government division of the National Research Council.

### Applicants Desired for Regular Army and Navy Medical Corps

With the discharge of numerous reserve officers from the military medical service, it is desired to again call attention to vacancies existing in both branches, Army and Navy. The Medical Department of the Army on November 15 contained 841 regular medical officers, and there were 710 vacancies. Since Nov. 11, 1918, 137 resignations have been tendered. The Medical Department of the Navy has at present 429 vacancies; 175 resignations from officers of permanent commission in this corps have been received since Nov. 11, 1918, and of those resigning 120 have already been discharged. The Navy is anxious to receive applications from younger medical men who desire to enter the medical service directly. For a number of years it has been the policy to recruit medical officers for the regular Navy Medical Corps from officers enrolled in the reserve force; but for a limited period it has been decided to offer opportunity to recent graduates to obtain a permanent commission directly from civil life. Graduates from reputable colleges between the ages of 21 and 32 years are eligible and, if interested, should address the Chief of the Bureau of Medicine and Surgery, Navy Department, Washington, D. C.

### Army Educational Service

Reports to the Surgeon-General on the activities of the educational services at fifteen Army general hospitals, and one base hospital for the month of September show that of 2,399 patients who received surgeon's certificates of disability, 2,269 were able to resume their old occupation, or were not in need of retraining, and only 130 were designated as unfit for their old occupation. November 7, there were 18,406 in sixteen Army hospitals in the United States.

### Bill to Reimburse Soldiers for Loss in Exchange

A measure of interest to all physicians and nurses who served with the American Expeditionary Forces who sustained losses by exchanging American money for the moneys of foreign countries has been introduced in the Senate by Senator William M. Calder of New York. The bill authorizes the War Department to pay to any officer, enlisted man, female nurse or civilian of the American Expeditionary Forces the sum equal to the amount of loss suffered by them, by reason of a fluctuation in the rate of exchange, on any negotiable instrument received from an Army officer for pay, allowances or reimbursement. The measure is Senate Bill 3420 and has been referred to the Senate Committee on Military Affairs.

### Decorations for Foreign Officers

The Distinguished Service Medal has been awarded to Surg. Vice-Admiral Sir Robert Hill, medical director general of the Royal Navy, and to Surg. Com. E. Sutton, in charge of the Royal Navy Hospital, Haulbowline.

### Last Trip of Hospital Train

U. S. Army Hospital Train No. 4, operated by the Medical Department of the Army, left New York, November 4, on its last trip to Denver. The patients on this train were tuberculosis cases, invalided from the Zone, and have been

at Seaboard military hospitals, Otisville, N. Y. During the war more than 125,000 patients have been cared for by U. S. Army hospital trains, which have been under the charge of James S. Wilson, Col., M. C., U. S Army, post surgeon at Hoboken, N. J.

### Decorations Awarded

The Distinguished Service Medal has been awarded to Charles N. Fiske, Capt., M. C., U. S. Navy, and to John J. Snyder, Com., M. C., U. S. Navy.

Dr. Franklin H. Martin, Chicago, formerly colonel, M. C., U. S. Army, had conferred on him the Order of Commander of Sts. Michael and George by the Prince of Wales, in Washington, D. C., November 14.

### Citation for Bravery

Capt. Sydney S. Schochet, M. C., U. S. Army, Chicago, has received the following citation with award of the military cross from the British government: "For conspicuous gallantry and devotion to duty during operations east of Ypres, Belgium, September 28 to October 1. This officer during the action in which his unit was engaged displayed the utmost gallantry and devotion to duty. He continually went out into the heavy shell fire to attend and assist in removing the wounded, and repeatedly took risks which he would not allow his assistants to share in his anxiety to assure their proper care and removal. It was owing to his untiring energy and complete disregard for his own personal safety that under every adverse circumstance the wounded of his own and several other units were safely evacuated. This example which he gave of unbroken cheerfulness and courage throughout the whole of these operations was a valuable stimulus to all who came under his authority."

### Citation for Colonel Seaman

The citation on page 12, G. O. 89, War Department, 1919, relating to Col. Gilbert E. Seaman, M. C., U. S. Army, Milwaukee, has been rescinded, and the following substituted:

Colonel Gilbert E. Seaman, M. C., U. S. Army, after serving with conspicuous success as division surgeon, 32nd Division, became chief surgeon 6th Army Corps and in this capacity was an important factor in the establishment of effective means for treating numerous sick and wounded.

### Citation Changed

The citation in Par. 9, of G. O. 89, W. D., 1919, relating to Col. James A. McCoy, is rescinded and the following substituted therefor:

John C. McCoy, Lieut.-Col., Medical Corps, U. S. Army. For exceptionally meritorious and distinguished services. He served with conspicuous success as commanding officer of American Red Cross Hospital No. 11, at Jouy-sur-Morin, and Chateau Thierry, from June to August, 1918. Although he was hampered with insufficient personnel and equipment, he nevertheless succeeded in caring for a large number of wounded men from the Marne, thereby rendering invaluable service to the American Expeditionary Forces. Home address 299 Broadway, Paterson, N. J.

### Woman Physician Decorated

In recognition of her work in the smallpox epidemic in Bucharest, Roumania, Dr. Margaret E. W. Farwell, Los Angeles, has been decorated with the Order of the Crown, officer's grade.

## MEDICAL OFFICERS, U. S. NAVY, RELIEVED FROM ACTIVE DUTY

*CALIFORNIA*
Lodi—Todd, E. B.

*GEORGIA*
Atlanta—Cannon, H. G.

*ILLINOIS*
Chicago—Costello, C. A.

*MAINE*
Portland—Fogg, C. E.

*MASSACHUSETTS*
Boston—Eldridge, D. G.

*MICHIGAN*
Indian River—McMillan, L. D.

*MISSISSIPPI*
Houlka—Harris, J. H.

*NEBRASKA*
Omaha—Mullin, R. F.

*NORTH CAROLINA*
Asheboro—Hayworth, R. W.

*PENNSYLVANIA*
Philadelphia—Croop, H. W.
Torrey, E. W.

*VERMONT*
Brattleboro—Tracy, E. L.

*VIRGINIA*
Cliffview—Kenny, G. B.

# *Foreign Correspondence*

## LONDON

Oct. 30, 1919.

### German Babies and Reparation

A memorial signed by leading public men, including Cardinal Bourne, the Archbishops of Canterbury and York, Sir William Osler and Sir Alfred Pearce Gould, has been presented to the reparation commission in Paris asking for consideration of the consequences of enforcing the provision in the peace treaty that Germany shall cede 140,000 milch cows and 10,000 goats. The memorial states that there is reliable evidence of terrible suffering among German children due to deficiency in the milk supply. The increase of tuberculosis has been immense, and in combating it, milk is a prime necessity. Any further reduction in the present deficient milk supply would have appalling consequences. Discussing this memorial, the *Times* says that throughout the war nothing has been so harrowing as the sufferings of the innocent, especially women and children. To end that suffering would fill the hearts of the Allied peoples with satisfaction. But German children are not the only children threatened with death and disease from shortage of milk. The children of the countries which the Germans looted and deliberately destroyed are suffering in the same way. Dr. Calmette has recently reported to the Académie de médecine that in Lille 8,000 out of 18,000 schoolchildren had to be sent to hospitals or convalescent colonies. On the ground of humanity, all babies have an equal claim; but justice must also be considered. The victims are equally innocent; but the sufferings of the French children are the direct consequence of the deliberately inhuman methods adopted by the Germans in an unjust war, while those of the German children are due to the misdeeds of their fathers. Justice requires that they shall make restitution.

### Influenza

During the last few weeks there has been in the ninety-six great towns of England and Wales a slight but gradual increase in the number of deaths attributed to influenza and a coincident rise in the number of notifications of acute primary and acute influenzal pneumonia. The increase appears to have been associated with prevailing meteorological conditions, and does not apparently signify more than the usual variation in catarrhal and lung diseases generally which may be expected at this season of the year. While the possibility of a fresh outbreak of influenza cannot be excluded, the data available do not at present afford any indication of an immediate recrudescence of the disease in epidemic form.

### The Red Cross in Peace

The work done by the British Red Cross in the great war is too well known to need commendation. It is now proposed to carry forward to the era of peace the benefits of that great organization. Its program is to promote the improvement of health, the prevention of disease, and the mitigation of suffering throughout the world whether in peace or war. Its work will be: (1) the care of the sick and wounded men of the army and navy whether still on the active list or demobilized; (2) such care as may still be necessary for prisoners of war; (3) the care of those suffering from tuberculosis, having regard in the first place to soldiers and sailors, whether they have contracted the disease on active service or not; (4) child welfare; (5) work parties to provide the necessary garments, etc., for hospitals and health institutions in need of them; (6) assistance in all branches of nursing, health and welfare work, auxiliary to the ministry of health; (7) Red Cross war and peace hospital library, and (8) home service ambulance work.

### Preventive Medicine

One of the first acts of the newly established ministry of health was to call for a memorandum on preventive medicine from the chief medical officer, Sir George Newman. He begins a very able review of the subject with the statement that "the first duty of medicine is not to cure disease, but to prevent it," and goes on to define the objects of preventive medicine as: (1) to develop and fortify the physique of the individual and thus to increase the capacity and powers of resistance of the individual and the community; (2) to prevent or remove the cause and conditions of disease or of its propagation, and (3) to postpone the event of death and thus prolong the span of man's life. A great deal has already been accomplished; but though the death rate of England and Wales has fallen from 20.6 per thousand living in 1868 to 13.5 in 1917, and the infant mortality rates from 155 to 96 per thousand births, we still

lose in England every year upward of 235,000 lives by the deaths of persons under the age of 50, and upward of 64,000 infants and have many stillbirths. Moreover, the influenza epidemic cost 6,000,000 deaths in India and 100,000 in England and Wales.

At present we have an immense body of knowledge and experience old and new, "but there is lack of correlation of the knowledge, and there is lack of understanding of the precise problems to be solved and of the ways and means by which they may be faced." In the first place, the new knowledge is insufficiently shared by the whole medical profession; in the second, the administration of the public health service, both central and local, is insufficiently coordinated and unified; and lastly, "There is all over the country inadequate treatment of the sick and incapacitated, in quantity and quality. The beginnings of disease are still almost entirely ignored. The treatment provided for the majority of the sick is insufficient and inadequate; it does not represent the best of present medical knowledge. Whole groups of disease are neglected, so far as prevention is concerned, for prevention has been too exclusively concerned with certain infectious diseases, and much disease is allowed to 'go by default,' untended and untreated. The provision of facilities for residential hospital treatment of patients requiring it (with the exception of the insane and the infectious) falls far short of what is necessary." Evidence of inadequacy is as follows: In 1918 there were probably 1,000,000 cases of measles in the country; tuberculosis claimed 92,000 fresh victims, and 6,500 newly born infants developed ophthalmia. Of the children at school in England a large number are backward, upward of 10 per cent. are unclean, and 10 per cent. are undernourished. Not less than half the schoolchildren stand in need of dental treatment, and half a million at least are urgently in need of it. Upward of half a million are so defective in eyesight as to be unable to take reasonable advantage of their lessons. Another quarter of a million suffer from ear and throat diseases. At the examination for national service it was found that the number of recruits placed in the lowest categories of ill health or unfitness amounted approximately to not less than 1,000,000.

The present position is thus summarized: 1. There is a steadily falling birth rate, which in 1917 reached a figure (17.18) gravely affecting the source of the nation. 2. There is a death rate (13.5) which shows a steady decline at all ages (1841-1845 compared with 1911-1915), and there is an increased expectation of life from birth upward; nevertheless, nearly half the deaths occur under 50 years of age. 3. Although the infant mortality rate (96 per thousand) is one of the lowest recorded, there is still unnecessary loss of life in infancy and before birth. 4. There is a relatively light burden of epidemic and infectious disease, which, with certain exceptions, is steadily decreasing in incidence and mortality, an indication of the victory of preventive medicine over some infectious diseases. 5. Tuberculosis, measles, acute rheumatism and influenza are, however, still prevalent and, with venereal disease, lead to much disablement and mortality. 6. There has been in recent years remarkable and continuous improvement in sanitary environment, though the problem of insufficient and unsuitable house accommodation remains.

With regard to the lines of reform, medical education is dealt with. The basal sciences of medicine must be studied more deeply, and clinical training must be more thorough. Especially must the mind of the student be directed to the beginnings of disease, its earliest signs and symptoms, notably those symptoms which are subjective, "for no laboratory experiment or mechanical device can serve as a substitute for this knowledge to which they are ancillary and auxiliary." The practice of preventive medicine in all forms of clinical work must be insisted on, since prevention is concerned not only with the mass, but also with the individual. With regard to the physician, early specialism is condemned. The need for closer integration between preventive and curative medicine is emphasized. In all cases the cause of disease, not in the abstract alone, but in the particular patient, must be sought. Disease must also be considered in its ancestry, for example, tuberculosis following measles. An adequate medical service is necessary, and a systematic and coordinated attack on the problem of disease. A large number of separate departments must work together, and many aspects of the problem must be viewed at once. For example, there are the problems of heredity and of eugenics; there are alcohol, syphilis and tuberculosis. There is the care of motherhood; there is the welfare work for infants; there is the medical care of the schoolchild. Sanitation is related to all these, and so is the vast problem of industrial hygiene. Infectious diseases have to be fought, and noninfectious diseases must be prevented. Finally, research work must be carried on, and the people must be educated in hygiene.

The keystone of the new edifice must be the general practitioner. He is the foundation of any medical service, its "pivot, its anchor, its instrument." Means must be found to help him in carrying on his professional education, for the advance of medicine is continuous. He must also be given opportunities for carrying on his practice in an adequate manner. He must have laboratory facilities and consultant advice and assistance. Indeed, he must be helped to help himself.

## PARIS

Oct. 23, 1919.

### Meeting of Surgeons

The twenty-eighth Congrès français de chirurgie was held recently under the chairmanship of Dr. Walther, surgeon of the Hôpitaux de Paris and agrégé professor at the Faculty of Medicine. In his opening address, the president reviewed the progress in surgery during the war. He also paid homage to the colleagues who had fallen on the field of honor.

Three subjects were discussed: internal traumatic lesions of the wrist; the treatment of cancer of the tongue by the surgical method, and paranephric tumors.

#### INTERNAL TRAUMATIC LESIONS OF THE WRIST

Internal traumatic lesions of the wrist constitute a comparatively new chapter in pathology. As recently as twenty years ago this subject was unknown, and it is only owing to roentgenographic researches that it has been opened up. Dr. Jeanne, acting professor in the École de médecine of Rouen, and Dr. A. Mouchet, surgeon of the Hôpitaux de Paris, emphasized particularly the part that roetgenography plays as an indispensable aid to clinical examination. In the unequivocal cases, roentgenography confirms and often completes the clinical examination. In the doubtful cases it reveals the lesion. This is especially true in the case of fractures of the semilunar bone, the os magnum, the unciform bone, etc., in which the signs are so vague. The roentgenographic examination is more to be relied on than the fluoroscopic, for fluoroscopy is entirely inadequate for the exploration of wrist lesions. At least two roentgenograms are always necessary: an anterior view and a lateral view. The two roentgenograms supplement each other. The examination of the plate is preferable to that of the print. The glass plate is, in fact, a more faithful reproduction than the print. The print, even though it has not been doctored, does not give as clear a picture as the plate, for the print varies with the time of exposure. An illuminating box is very useful in examining the plate. However, one must bear in mind that the interpretation of a roentgenogram of the wrist is not an easy matter and requires a long preliminary training. In very delicate cases it is advisable to roentgenograph also the sound wrist, for a comparison with the injured wrist will be very instructive. A comparison of this kind would be especially useful should there exist in a given subject marked variations from normal in the size and shape of the wrist bones.

Certain fractures of the carpal bones—compression fractures of the semilunar, and fractures of the os magnum and of the unciform bone—are often listed under such headings as "chronic rheumatoid arthritis," "tuberculous arthritis of the carpus, or "chronic synovitis of the wrist," since these bones present anatomic alterations that are rather indistinct for an eye that is not trained to detect them. Furthermore, it is well to know that these fractures are much more frequent than is commonly supposed. Another reason why they often remain long undiscovered is that they are frequently the result of very slight traumatisms that cause little disturbance of function, at least at the start. They are often regarded as sprains, so the patient resumes his work, and when later he is compelled to stop work and consults his physician, no account is taken of the former traumatism, even if he remembers it, and the physician is liable to overlook the fracture of the carpus if he is not thoroughly familiar with the interpretation of roentgenograms of this region.

As regards treatment, Jeanne and Mouchet hold that the subtotal luxation of the semilunar bone should be reduced promptly to avoid stiffening of the wrist and the nervous symptoms that are the inevitable consequence of lesions left to heal spontaneously. If a month has passed since the injury, the reduction should no longer be attempted; but one should proceed with the resection of the semilunar, and in

case there exists a concomitant fracture of the scaphoid, the superior fragment of the scaphoid that is attached to the semilunar should be removed. An isolated fracture of the scaphoid justifies surgical intervention if vicious consolidation exists or if the lesion is painful; removal of the bone is indicated. This treatment is recommended also for fractures of the other carpal bones under the same circumstances.

In the course of the discussion to which the communication of Jeanne and Mouchet gave rise, Dr. Maurice Péraire, surgeon of the Rothschild Hospital in Paris, called attention to the excellent service that stereoroentgenography may render in the diagnosis and control of internal lesions of the wrist. He himself always had recourse to this method for the reason that it afforded a view of the anteroposterior relief and, by reversing the plates, of the postero-anterior relief.

### MASSAGE IN FRACTURES

Dr. Petit de la Villéon of Bordeaux made the remark that while he served in the capacity of expert in industrial accidents he was struck with the bad results secured by the method that confines itself exclusively to massage. A large number of workmen treated in this fashion are afterward referred to the expert in industrial accidents. Dr. Petit de la Villéon was often impressed with the marked deformities resulting from the massage treatment which were frequently associated with notable functional weakness. He thinks that the method recommended by Lucas-Championnière has been much overdone. No doubt the fundamental idea of this method is perfectly correct, but it should be emphasized that the method is indicated only in fractures without displacement. On the other hand, if it is exaggerated to the extent that it is made a routine system, this method constitutes, as it were, a dangerous pitfall into which the general practitioner unconsciously glides whenever he is confronted with fractures presenting marked displacement; for such fractures, if treated by massage exclusively, heal with frankly bad results. Fracture of the radius with displacement, such as one encounters in adults, and, more particularly, in workmen who are the victims of industrial accidents, should be reduced at once, the reduction being done, if necessary, with the aid of general anesthesia. After the fracture is reduced, it should be immobilized by means of a light plaster splint that will keep it in the position of moderate palmar flexion and inclined toward the ulna. Only after immobilization for a period of from ten to fifteen days may the splint be properly removed and the treatment by means of massage and mobilization be begun. The results will be all the better for the fact that the reduction was well done in the beginning and the fracture kept immobilized in a suitable position. Dr. P. Barbarin of Paris also expressed himself to the effect that the method of "immediate mobilization and massage without reduction" had been overdone in fractures of the radius. He reduced all fractures associated with displacement or penetration and immobilized them for from twelve to fifteen days in a plaster splint in the position of the classic flexion of the hand with a deviation to the ulnar side.

Dr. L. Bérard, professor of clinical surgery at the Faculty of Medicine of Lyons, declared himself an advocate of immobilization of all fractures of the radius, even though it should be for only four or five days and by means of a light splint. Contrary to the views of Jeanne and Mouchet, he thinks the question of irreducibility of the fracture is determined rather by the anatomic type of the fracture than by the age of the lesion. He also thinks that after several attempts at reduction under anesthesia the surgeon should not too stubbornly insist on reducing a fracture, especially in view of the fact that surgical intervention is easy and of good prognosis.

### Medical Care for Military Pensioners

A decree has just been issued according to the terms of which the state must provide all soldiers and sailors who are beneficiaries under the army and navy pension laws, for the duration of their life, all medical and surgical care (including pharmaceutical remedies) necessitated by the wounds and diseases, contracted or aggravated in line of duty, that constituted the cause for their discharge.

### Personal

At one of its recent meetings, the Academy of Medicine chose three foreign correspondents in the fourth division so called (physics and chemistry as applied to medicine and pharmacy). The correspondents chosen were M. Bruylands, professor of the University of Louvain and president of the Academy of Medicine of Belgium; M. Paterno of Rome, and Dr. Machado of Lisbon.

## Marriages

Albert Bowen, Capt., M. C., U. S. Army, Rochester, N. Y., to Dr. Amy A. Metcalf of Tehchow, Shantung, China, at Lambezellec, France, October 27.

Hampden Sidney Lewis, Bay St. Louis, Miss., to Mrs. Corinne DeMontluzin Benedict of New Orleans, October 29.

Herbert Herman Schoenfeld, Washington, D. C., to Miss Martha Wills of Danville, Va., at New York, October 18.

Fred Merten Rohow, Ashland, Wis., to Miss Lucile Agnes West of Wheeling, W. V., at Chicago, November 11.

James Wright Clarkson, Hickory, N. C., to Miss Caroline Robinson Davis of Petersburg, Va., October 28.

Leroy Loren Belt, Kenton, Ohio, to Miss Frances D. Jordan of Marblehead, Ohio, recently.

## Deaths

**Charles Noah Dixon Jones,** New York City; Long Island College Hospital, Brooklyn, 1882; College of Physicians and Surgeons in the City of New York, 1883; aged 62; a fellow of the New York Academy of Medicine, and a member of the Medical Society of the State of New York; surgeon to the Woman's Hospital, and gynecologist to the Southern Dispensary and Hospital, New York City; for many years connected with the health department of New York; died at the Lincoln Hospital, New York City, October 30.

**Albert VanDevanter Braden,** Ishpeming, Mich.; University of Virginia, Charlottesville, 1910; aged 31; a member of the Michigan State Medical Society; who served as captain, M. R. C., U. S. Army, during the war, and was chief medical officer of Evacuation Hospital No. 7, in France, and was honorably discharged, May 3, 1919; died in the Ishpeming Hospital, November 8, from pneumonia.

**William Wallace MacFarlane,** St. Louis; Washington University, St. Louis, 1866; aged 85; formerly of Auxvasse, Mo.; formerly assistant physician of State Hospital No. 1, Fulton, Mo., and superintendent of the Agnew (Calif.) State Hospital; a Confederate veteran; once surgeon to the Confederate Home, Mo.; died in the Masonic Home, St. Louis, October 30.

**Stewart Alfred McComber,** Schenectady, N. Y.; Detroit College of Medicine and Surgery, 1903; aged 48; associate director of athletics at Foyer du Soldat, Paris, since July, 1918; formerly physical director and professor of hygiene in Union College, Schenectady; died in the American Hospital at Neuilly, France, November 5, from cerebrospinal meningitis.

**Ivan Dwight Hayes,** Toronto, Ont; University of Toronto, Ont., 1911; aged 35; who enlisted in the Royal Army Medical Corps in 1915; was invalided home from France the next year, and later reenlisted for home service, from which he was discharged in 1918, on account of heart disease; died, September 12, from heart disease.

**Stephen Jackson Keefe** ⊕ Elizabeth, N. J.; University of the City of New York, 1889; aged 52; assistant surgeon of the Third New Jersey Volunteer Infantry during the war with Spain; coroner of Union County from 1895 to 1898; assistant surgeon to St. Michael's Hospital, Newark; died, about October 26.

**Lewis L. Williams,** Brazil, Ind.; Louisville (Ky.) Medical College, 1878; aged 61; a member of the Indiana State Medical Association; local surgeon of the Terre Haute, Indianapolis and Eastern Traction Company; secretary of the city board of health; was shot and instantly killed, in Brazil, November 3.

**Trevanian V. Dupuy,** Chicago; Miami Medical College, Cincinnati, 1889; aged 57; formerly safety director of Ironton, Ohio; was found dead in Jackson Park, Chicago, October 28, death being due to a gunshot wound of the head, self-inflicted, it is believed, while despondent on account of ill health.

**Andrew J. Bennett,** Busti, N. Y.; University of Buffalo, 1891; aged 59; a member of the Medical Society of the State of New York; health officer of Chautauqua County;

⊕ Indicates "Fellow" of the American Medical Association.

for four years supervisor of Bustl; died in the Women's Christian Association Hospital, Jamestown, November 1.

**Richard E. Venning** ● Charlestown, W. Va.; University of Pennsylvania, Philadelphia, 1891; aged 51; once president of the West Virginia State Medical Association; founder of the Charlestown Hospital; died at the home of William O. Norris, Charlestown, October 31.

**Otto Ernest Plath** ● Phoenix, Ariz.; Miami Medical College, Cincinnati, 1896; aged 55; also a pharmacist; secretary of the Arizona State Medical Association in 1899, and president in 1907; local surgeon of the Santa Fe System; died, November 3, from acute bronchitis.

**Charles Frederick Sterling,** Warrenton, Va.; Pulte Medical College, Cincinnati, 1877; aged 73; once professor of diseases of the eye and ear, University of Michigan, and a member of the staff of Grace Hospital, Detroit; died, October 28, from cerebral hemorrhage.

**Orfila James Allen,** Arco, Idaho; Gross Medical College, Denver, 1898; aged 55; chief surgeon of several mining companies; once secretary of the Idaho State Medical Association, and state board of medical examiners; died, August 22, from carcinoma of the throat.

**William H. Ussery,** Lebanon, Okla. (registered, Oklahoma, act of 1908; aged 64; a member of the Oklahoma State Medical Association; a practitioner for twenty-four years; died in the Gainsville (Texas) Sanitarium, October 29, from cirrhosis of the liver.

**Samuel Belash Childs,** Brooklyn; University of the City of New York, 1869; aged 76; a member of the Medical Society of the State of New York; for fifty years attending physician to the Faith Home for Incurables; died, November 8, from cerebral hemorrhage.

**Frank Fulmer Castlebury,** Roaring Branch, Pa.; Jefferson Medical College, 1896; aged 57; a member of the Medical Society of the State of Pennsylvania; died at the home of his sister in Williamsport, Pa., October 28, from chronic parenchymatous nephritis.

**Aaron Boylan,** Milford Center, Ohio (license, Ohio, 1896); aged 80; for fifty-six years a practitioner; a veteran of the Civil War; a member of the Ohio State Medical Association; for many years local surgeon for the Pennsylvania System; died, November 4.

**Caleb William Sommerville,** Highland Park, Philadelphia; Medico-Chirurgical College of Philadelphia, 1902; aged 42; lieutenant, M. R. C., U. S. Army, and honorably discharged, March 27, 1918; died, November 4, from pneumonia.

**Farquard A. Mayes,** Hayti, Mo. (license, Missouri, 1876); aged 71; a member of the Missouri State Medical Association; a practitioner since 1872; also a druggist; local surgeon for the Cotton Belt System; died, November 4.

**James Henry Breen** ✠ Hudson, Mass.; Tufts College Medical School, Boston, 1906; aged 41; for several years town physician; dropped dead, November 3, near the railway station at Hudson, while running to catch a train.

**Abraham S. Brinkerhoff,** Brooklyn; New York Homeopathic Medical College, New York City, 1892; aged 63; a member of the staff of Flower and Bellevue hospitals; died in Miami, Fla., November 8, from heart disease.

**Edward L. Baker** ✠ Indianola, Iowa; Louisville (Ky.) Medical College, 1873; aged 65; medical director of the Order of United Craftsmen; secretary of the Warren County Medical Society in 1916; died, November 2.

**Robert Little Kennedy,** Royal Oak, Mich.; Detroit College of Medicine and Surgery, 1898; aged 45; formerly medical superintendent of the State Tuberculosis Sanatorium, Howell, Mich.; died, October 28, from myocarditis.

**John Abner Penton,** Goodwater, Ala.; College of Physicians and Surgeons, Baltimore, 1900; aged 49; a member of the Medical Association of the State of Alabama; died, October 17, from cirrhosis of the liver.

**James W. Smith,** Richmond, Mo.; Washington University, St. Louis, 1874; aged 71; a member of the Missouri State Medical Association, and president of the Richmond Exchange Bank; died, October 21.

**William Remma Ditmars** ● North Adams, Mich; University of Michigan, Ann Arbor, 1872; aged 73; once president of the Hillsdale County Medical Association; died, November 2, from arteriosclerosis.

**Lewis Beecher Thomson,** Washington, D. C.; Maryland Medical College, Baltimore, 1905; aged 70; a member of the Medical Society of the District of Columbia; died, October 15, from angina pectoris.

**Frank O. Sherwin,** Duluth, Minn.; Rush Medical College, 1878; aged 65; formerly health commissioner of Duluth; for twenty years physician to the port of Duluth; died, October 24, from myocarditis.

**Whitfield Timlow Seeley,** Warwick, N. Y. (license, New York, 1901); aged 73; a member of the Medical Society of the State of New York; a practitioner for forty-four years; died, October 9.

**John Gygi** ● Big Falls, Wis.; Ohio Medical University, Columbus, 1906; aged 43; died, October 22, from an accidental overdose of chloroform taken for the relief of gallstone colic.

**Samuel Phillips,** Leavenworth, Kan.; University of Maryland, Baltimore, 1853; aged 89; at one time a surgeon in the army; died in St. John's Hospital, Leavenworth, October 31.

**Albert Henry Cox,** Stephens, Mo.; Missouri Medical College, St. Louis, 1882; Bellevue Hospital Medical College, 1883; aged 60; died, October 27, from cerebral hemorrhage.

**Abram Case Williams,** Springfield, Mass.; Yale University, New Haven, Conn., 1895; aged 50; a member of the Massachusetts Medical Society; died, October 25.

**Willis Swanner Anderson** ● Shelby, Ohio; University of Pennsylvania, Philadelphia, 1889; aged 53; health officer of Shelby; died, November 5, from septicemia.

**Gideon D. Spengler,** Allentown, Pa., and Philadelphia; Jefferson Medical College, 1878; aged 73; died in the Jefferson Hospital, Philadelphia, October 24.

**Charles D. Arnold,** El Reno, Okla.; University of Louisville, Ky., 1876; aged 73; a member of the Oklahoma State Medical Association; died, October 25.

**Mary Ann Armstrong,** Berkeley, Calif.; University of Michigan, Ann Arbor, 1879; aged 76; formerly a resident of Santa Cruz, Calif.; died, November 3.

**Oscar L. Muffly,** Turbotville, Pa.; College of Physicians and Surgeons, Baltimore, 1886; aged 58; died, November 11, from chronic interstitial nephritis.

**Clayton W. Carson,** Chicago; Rush Medical College, 1884; aged 59; died in his automobile, near St Luke's Hospital, November 8, from angina pectoris.

**George W. Farver,** Hammond, Ind.; Indiana Medical College, Indianapolis, 1875; aged 69; died in Montezuma, Ind., October 21, from cholangeitis.

**Charles Henry Hall** ● Huron, S. D.; Hahnemann Medical College, Philadelphia, 1876; aged 73; died in a hospital in Minneapolis, October 30.

**Newton C. Fancher,** Kansas City, Kan. (license, Kansas State Board of Eclectics); aged 84; a veteran of the Civil War; died, October 20.

**Edgar Bertrand Doolittle** ● Hazleton, Pa.; University of the City of New York, 1882; aged 59; died, October 27, from bronchopneumonia.

**Edward Lewis Hottenstein,** Kutztown, Pa.; Jefferson Medical College, 1886; aged 55; died, October 27, from carcinoma of the stomach.

**William John Humphrey,** Cherryville, Pa.; University of Pennsylvania, Philadelphia, 1872; aged 69; died, October 19, from nephritis.

**Alexander Bleecker Leggett,** Babylon, L. I., N. Y. (license, New York); a practitioner since 1858; aged 84; died, November 6.

**Major D. Sterrett,** Beckville, Texas; Atlanta (Ga.) Medical College, 1866; aged 79; a veteran of the Civil War; died, October 24.

**Pettygrew M. Eakes,** Philadelphia, Miss.; Kentucky University, Louisville, 1905; aged 41; died, October 21, from nephritis.

**George O. Taylor,** Chicago; Rush Medical College, 1868; died at Hot Springs, Ark, November 14, from malignant disease.

**Wesley Ivy Wimberly,** Hammon, Okla.; Tulane University, New Orleans, 1913; aged 31; died, October 24, from pneumonia.

**John William Respass Corlis,** Brooksville, Ky.; Medical College of Ohio, Cincinnati, 1855; aged 86; died, October 27.

**George W. Kern,** Elizabethtown, Pa; Hahnemann Medical College, Philadelphia, 1878; aged 71; died, October 28.

**John Wesley Reading,** Marion, Ohio; Bellevue Hospital Medical College, 1865; aged 84; died, October 25.

**Edward Thomas Stevens,** Buffalo; University of Buffalo, 1886; aged 60; died, October 14, from pneumonia.

# The Propaganda for Reform

IN THIS DEPARTMENT APPEAR REPORTS OF THE JOURNAL'S BUREAU OF INVESTIGATION, OF THE COUNCIL ON PHARMACY AND CHEMISTRY AND OF THE ASSOCIATION LABORATORY, TOGETHER WITH OTHER MATTER TENDING TO AID INTELLIGENT PRESCRIBING AND TO OPPOSE FRAUD ON THE PUBLIC AND ON THE PROFESSION

## THE ELI PRODUCTS OF ELI H. DUNN

Physicians are receiving some miscellaneous advertising matter from a concern that seems to operate under various names such as "E. H. Dunn & Co.," "Eli H. Dunn," "Eli Laboratory," etc. The concern is located at 3820 Main St., Kansas City, Mo. One JOURNAL reader, who is evidently not greatly impressed by this material, forwards the stuff to us with the laconic request: "Will you please give me your opinion on this junk?"

The "junk" referred to comprised, in part, an advertising leaflet on "Eli 606 Capsules," another leaflet on "Eli Vaginal Capsules," still another on "Eli 'Vim' Restorative;" then there was reference to the inevitable nostrum for intravenous use: "Ampoules Eli Venhydrarsen." A four-page leaflet, headed in large and very black letters "Confidential Guide to Live Wire Physicians Only," expressed its key-note in the opening paragraph:

"How to make MONEY as well as REPUTATION in the treatment of all CHRONIC AILMENTS and all types, forms and sequella of VENEREAL diseases."

The "Eli 'Vim' Restorative" is said to be a "tonic aphrodisiac." The "action" of the product is to "Arouse Sexual Ardor and Desire. Influx blood supply to the genital organs." A postscript to the "Guide" urges physicians:

"If you do not already use Intravenous Serums, by all means get an outfit, if for no other reason than to meet the popular DEMAND."

A "Special Note" in the "Confidential Guide" advises physicians who "have to deal with Hysteria" to "write the Author of this Guide, who will explain by personal letter a method of cooperation by which such Convulsions may be At Once and forever stopped. . . . There will be $100 for You from every case treated." One physician wrote to the "Author of this Guide"—Eli H. Dunn, M.D.—asking for further information on this treatment for hysteria. He received in reply two letters both signed Eli H. Dunn; one was to be shown to the patient, the other was for the doctor's own information. The letter for the patient to see described the marvelous effects of "Dunn's Intravenous and Restorative Treatment" in hysteria and recommended it "with the utmost confidence in every case able to pay you the fee commensurate with the service you render." Then followed these two paragraphs:

"The cost of the treatment when administered by yourself is $300 CASH WITH ORDERS which includes one complete outfit and technique for administering.

"Should you call me personally in consultation an additional fee of $150 per diem covering the time I am away from my Kansas City office; fees to be collected and held until I arrive."

The letter that was intended only for the doctor's eye declared:

"You are to have $100 of the fee and $50 of the per diem."

It explained that the "complete outfit" referred to in the "patient's letter" would "consist in part of a tube of intravenous medication" and doses of "Restorative Capsules" and "Eli 606 Capsules."

Eli H. Dunn seems to have had a somewhat varied and spectacular career. After being graduated in 1885 he apparently started practice in Orion, Ill. During the '90's he was practicing at Elma, Iowa, and about 1900 he seems to have moved to Kansas City, Mo. During 1906 and 1908 he also had an additional office at Denver, Colo. About this time he was exploiting "Dunn's Uterine Evacuant" which was "a strictly legitimate" product which could "be injected within the uterus with perfect safety and immediate effect." This stuff was advertised both from the Kansas City and the Denver offices. The "Personal Column" of a Kansas City paper in 1910 carried the message to "Ladies" that "Dr. Dunn" was a "Regular physician for women only." Dunn's violation of the postal laws in 1911 and of the federal Food and Drugs Act in 1912 need not be gone into at this time.

THE JOURNAL would feel like apologizing for devoting space to such a preposterous scheme were it not for the fact that physicians, being human, sometimes "fall for" preposterous schemes. Some, we know, have nibbled at Dunn's bait; others may do so. The gross commercialism that permeates the advertising matter sent out by Dunn again emphasizes the fact that the fad for intravenous medication offers an attractive field for those who would exploit our profession.

## OMISSION OF COTARNIN SALTS (STYPTICIN AND STYPTOL) FROM N. N. R.

### Report of the Council on Pharmacy and Chemistry

The Council has authorized publication of the following report.

W. A. PUCKNER, Secretary.

Salts of the base cotarnin have been used as local and systemic hemostatics. The hydrochlorid was first introduced as "Stypticin," and is now in the pharmacopeia as cotarnin hydrochlorid (*Cotarninae Hydrochloridum, U. S. P.*). The phthallic acid salt of cotarnin—cotarnin phthallate—was introduced as "Styptol." Both Stypticin and Styptol were admitted to New and Nonofficial Remedies. In 1918 the Council voted to omit Stypticin because the former American agents were no longer offering it for sale. Styptol was retained and is described in N. N. R., 1919.

As was pointed out in the description (N. N. R., 1918), the evidence for the usefulness of the cotarnin salts has been contradictory and unsatisfactory; but since the available data against the efficiency were at least equally unreliable, the Council deemed it best to retain them in N. N. R. pending a thorough investigation of the subject. This was undertaken by P. J. Hanzlik, at the suggestion of the Therapeutic Research Committee of the Council.

A reliable judgment of hemostatic efficiency can be formed only on a basis of strictly controlled conditions, which can best be furnished in the laboratory. Hanzlik repeated the principal experiments published by previous investigators, and applied a number of new or improved methods. The results (published in the *Journal of Pharmacology and Experimental Therapeutics* **10**:523, 1918; **12**:71, 1919) show the following:

*Direct Application to Wounds.*—The widely quoted results of the gynecologist K. Abel, on the footpad of cats, were found to be quite unreliable. When the experiment is properly controlled, the results are either negative or the bleeding may be increased. Quantitative experiments on wounds of the footpad of dogs showed that cotarnin invariably *increased* the bleeding. Equally negative or unfavorable results were obtained with wounds to the comb of roosters, and to the liver and spleen.

*Direct Action on Vessels.*—The results of perfusion experiments were variable, but, in general, showed a vasodilation action instead of constriction. This holds true also of the uterine vessels. The vessels in the living animal (rabbit's ear) were also unaffected.

*Systemic Administration.*—The bleeding from an irrigated wound was not modified directly by intravenous injection of cotarnin salts, but varied merely with the state of the blood pressure.

The evidence for the inefficiency of cotarnin salts as hemostatics seemed so conclusive as to warrant the Council in rescinding the acceptance of Styptol, and directing the omission of the general article on cotarnin salts and the description of Styptol from New and Nonofficial Remedies.

**The Frequency of Multiple Births.**—For a rough approximation, the order of frequency with which twins, triplets, etc., occur is, according to Knibbs, as follows: In a series of confinements 1 per cent. will present twins, 0.01 per cent. triplets, 0.0001 per cent. quadruplets and 0.00002 per cent. quintuplets.

# Correspondence

## A HYPOTHESIS BEARING ON DISEASE THERAPY

*To the Editor:*—I desire to advance a hypothesis as a serviceable conception of disease processes.

Certain organisms or the toxins elaborated by them or poisons otherwise produced initiate specific processes in certain structures. These processes, if unchecked, run a definite course, and tend to produce characteristic symptoms. In many individuals so afflicted there comes a time in which the injured structures are sensitized not only to the specific proteins elaborated by the causal organisms, but also to allied proteins elaborated by other organisms, and perhaps to allied bodies chemically produced. In such instances the structural change already initiated tends to run as it would if the controlled original cause were still acting.

Thus a tabetic, as a result of vigorous antisyphilitic treatment, may become symptomless, and his cerebrospinal fluid may be brought to normal; but if he should suffer from an infection, as acute appendicitis, the patient's chief and practically only complaint may be acute lightning leg pains. Or, on the other hand, vigorous antisyphilitic treatment may afford a tabetic little relief from such pains, while the removal of a focus of infection may lead quickly to their disappearance.

Or a patient with latent tuberculosis may complain of periarthritic pains due to a fibrositis, the result of infected tonsils. The removal of the tonsils may give speedy relief; but if the latent tuberculosis becomes active, the pains are likely to recur, to be again relieved by the abating or removal of the tuberculous focus.

Many similar instances might be enumerated, each one capable perhaps of other interpretation, but pointing in their summation to the hypothesis suggested.

The moral to be drawn is that a patient with a syphilitic or other infection should not only be treated for that particular infection, but also be rendered as free as possible of other foci, though they apparently have no bearing on his immediate symptoms; and in patients who do not get relief by the treatment of the initiating cause, we must consider the probability of secondary sensitization.

CHARLES MINER COOPER, M.D., San Francisco.

## "THE RANGE OF THE GENERAL PRACTITIONER IN PSYCHIATRIC DIAGNOSIS"

*To the Editor:*—I have just been reading the little gem by Dr. O. I. Hess (THE JOURNAL, Nov. 15, 1919, p. 1544), and thought that possibly I could inform him regarding the meaning of "somatopsychic." The term is such a common one and has so long been firmly embedded in psychiatric language that I had supposed every medical student would have heard it at least once. Certainly, no man can read a psychiatric textbook published in this country in the last fifteen or twenty years and not find the term.

It was originally proposed by Wernicke, whose contributions did so much to clear up the confusion that existed in certain fields in psychiatry. Wernicke divided delusions into three types: allopsychic, autopsychic and somatopsychic. White's "Outline of Psychiatry" or any other standard book will give a good discussion of these terms. In fact, the terms themselves are so simply compounded that I am surprised to find that one who revels in the words "esoteric" and "pedantic" should have any difficulty in arriving at the correct meaning.

As for his discussion of the term "disoriented" versus "confused," I have only this to say, that if the questioner can define "confused" he will do more than any psychiatric writer I know, including Kraepelin; whereas, "disorientation" is a word which can be precisely defined and used by people in all parts of the world with exactly the same meaning.

It is regrettable, of course, that the doctor should have found his "ideation" and "orientation" somewhat befogged by the use of these terms, but I am sure that we all find occasional words which we do not understand in the writings of specialists in other fields than our own. Of course, the question of terminology is an extremely important one. New words have as their greatest value that they can be precisely defined to convey a certain idea, whereas old words that have been in use for a long time have changed greatly in meaning from time to time, and very frequently no two persons can be found to agree on what is meant by a given term. The trouble is that the average man regards all efforts to improve terminology as pedantic, and dismisses the whole problem with no further effort to understand.

It is, accordingly, a good sign when one is interested enough to attempt to find out what a given word means. Let us hope there will be many more such inquiries.

LAWSON G. LOWREY, M.D., Boston.
Chief Medical Officer, Boston State Hospital,
Psychopathic Department.

## THE USE OF ACRIFLAVINE

*To the Editor:*—Under the section devoted to N. N. R. (THE JOURNAL, Nov. 8, 1919, p. 1443), the action and uses of acriflavine are noted, with the fact that its clinical use has occasioned numerous and exceedingly conflicting published reports. My experience is that the preparation has no special virtue, compared to the usual nontoxic antiseptics, when employed in the cited indications. Acriflavine's chief value is its remarkable power to stimulate epithelial growth on healthy granulating surfaces. In cases in which Thiersch's method of skin grafting is indicated, as after amputation of the breast, I follow and recommend the practice of Mr. A. J. Couzens of London—wet eusol dressings for from twenty-four to thirty-six hours, then changing to wet acriflavine dressings, 1:1,000. Healing occurs with great rapidity.

MAXWELL QUACKENBOS, M.D., New York.

## EXPANSION OF THE WORK OF THE RED CROSS

*To the Editor:*—I have just finished reading Dr. Farrand's pamphlet on health centers as peace time activities for the great Red Cross organization. As near as I can judge, most of this work will be planned by laymen, and I can see in it, what every medical man will see on reflection, the possibility of sentimentality overriding common sense.

If this health work is to do any real good, it must be steered by wise counsel of the best men in the profession; and in my judgment it is of such importance that the problems should be handled by a special committee of the American Medical Association. It is possible that something of the sort has been planned.

Enthusiasts in health and welfare work find it easy to strike a popular chord and arouse enthusiasm in the lay mind over their theories, some of which would not stand analysis; and the thought occurred to me that one way our Association might help retain sanity in this field is to see that the medical profession, through well chosen speakers, has its views presented in the same way as those who bring out all this new propaganda.

Somebody in every community will have to sit on the lid.

W. S. CHASE, M.D., Akron, Ohio.

## "THE RELATIONSHIP BETWEEN HERPES ZOSTER, SYPHILIS AND CHICKENPOX"

*To the Editor:*—I have read your editorial on the relationship between herpes zoster, syphilis and chickenpox. The segmental distribution and spinal findings indicate that it may have a central causative factor, as distinguished from peripheral nerve irritations. Some time ago I had a case of gallstone disease in which occurred a marked herpetic eruption over the abdomen in the region of the gallbladder. At this time the patient was suffering from repeated attacks of colic with marked jaundice, evidently due to common duct

blockage. I operated on her a few days later, the jaundice having cleared up considerably, and at that time found the cystic duct obstructed by a large stone, as well as a number of stones in the gallbladder. I have no doubt that in this particular case there was so much irritation about the gallbladder neck that a "reflex irritation" brought about the external herpetic eruption by way of the nerves from the duct region and thence along the segmental distribution. This case would seem to indicate that there may be other than purely "central spinal" sources for herpetic-like eruptions.

W. G. Parker, M.D., Mount Vernon, Ill.

## Queries and Minor Notes

Anonymous Communications and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted, on request.

### URINARY TESTS FOR SYPHILIS

*To the Editor:*—Will you kindly inform me whether the test in the enclosed "literature" is what it is represented to be?

Charles M. Thomas, M.D., Sunbury, Pa.

Answer.—The "literature" referred to by Dr. Thomas dealt with the "Uri-Na Test" sold by the Standard Appliance Company of Philadelphia. There seems to be a strong family resemblance between this alleged test and that known as "Capell's Uroluetic Test," which was discussed in the Propaganda Department of The Journal, Aug. 23, 1919. Of that The Journal said: "Unfortunately, its scientific value to the sufferer is negligible compared with its economic value to the exploiter. It is not so much a test for lues in the patient as of credulity in the doctor." The same may be said of the "Uri-Na Test." The facts are, there is no method at present known by which the absence or presence of syphilis may be determined by a simple color test of the urine.

### USE OF MERCURIC CYANID PREPARATIONS SUBCONJUNCTIVALLY

*To the Editor:*—Please give me the percentage of solution and indications for the use of mercuric cyanid subconjunctival injections; also the indications for normal salt solution in the same location.

F. C. McClanahan, M.D., Tanta, Egypt.

Answer.—Both mercuric cyanid and mercuric oxycyanid, in solutions varying in strength from 1:40,000 to 1:2,000, are often found to be of signal value when used subconjunctivally, in hypopyon ulcer, and in other purulent or deep-seated infections of the eye. It must be remembered, however, that even in a thoroughly cocainized eye, these injections are extremely painful, and for this reason many eye surgeons do not wish to use this remedy. Physiologic sodium chlorid solution is employed for the same conditions. From 10 to 20 minims of a 5 to 10 per cent. solution are injected, and repeated at two to three day intervals, according to the results obtained.

### RADIUM SALTS

*To the Editor:*—Please state what is the most effective radium salt for treatment.

George A. Hartley, M.D., Battle Creek, Iowa.

Answer.—New and Nonofficial Remedies, 1919, recognizes the following salts of radium: radium bromid, radium carbonate, radium chlorid and radium sulphate. The efficacy of these salts depends essentially on the percentage of radium which they contain, and accordingly all are sold on the basis of their radium content. The choice of one or the other depends on physical factors. Thus the bromid and the chlorid are commonly used in the applicators, whereas the insoluble sulphate is used in constructing an apparatus for the production of water charged with radium emanation.

For more complete details refer to New and Nonofficial Remedies.

## Medical Education, Registration and Hospital Service

### COMING EXAMINATIONS

Arizona: Phoenix, Jan. 6. Sec., Dr. Ancil Martin, 207 Goodrich Bldg., Phoenix.

Colorado: Denver, Jan. 6. Sec., Dr. David A. Strickler, 612 Empire Bldg., Denver.

Delaware: Dover, Dec. 9-11. Sec., Regular Board, Dr. P. S. Downs, Dover. Sec. Homeopathic Board, Dr. H. W. Howell, 824 Washington St., Wilmington. Pres. Medical Council, Dr. Henry W. Briggs, 1026 Jackson St., Wilmington.

Florida: Jacksonville, Dec. 15-16. Sec., Dr. G. A. Muneh, 1306 Franklin St., Tampa.

Florida: Tampa, Dec. 1-2. Sec., Regular Board, Dr. Wm. M. Rowlett, Citizens' Bank Building, Tampa.

Illinois: Chicago, Dec. 1-3. Mr. F. C. Dodds, Supt. of Registration, Springfield.

Iowa: Des Moines, Dec. 16-18. Sec., Dr. Guilford H. Sumner, Capitol Bldg., Des Moines.

Kentucky: Louisville, Dec. 2. Sec., Dr. A. T. McCormack, 532 W. Main St., Louisville.

Louisiana: New Orleans, Dec. 1-3. Sec., Regular Board, Dr. E. W. Mahler, 141 Elk Place, New Orleans.

Maryland: Baltimore, Dec. 9-12. Sec., Dr. J. McP. Scott, 137 W. Washington St., Hagerstown.

North Dakota: Grand Forks, Jan. 6. Sec., Dr. John G. Arneberg, Grand Forks.

Ohio: Columbus, Dec. 2-4. Sec., Dr. H. M. Platter, State House, Columbus.

Oregon: Portland, Jan. 6. Sec., Dr. Frank W. Wood, 559 Morgan Bldg., Portland.

Virginia: Richmond, Dec. 9-12. Sec., Dr. J. W. Preston, 511 McBain Bldg., Roanoke.

Washington: Spokane, Jan. 6-8. Sec., Dr. C. N. Suttner, 415 Old National Bank Bldg., Spokane.

### North Carolina June Examination

Dr. H. A. Royster, secretary of the North Carolina State Board of Medical Examiners, reports the oral, written and practical examination held at Raleigh, June 24-28, 1919. The examination covered 15 subjects and included 72 questions. An average of 80 per cent. was required to pass. Of the 68 candidates examined, 59 passed and 9 failed. Twenty-three candidates were licensed through reciprocity. Seven candidates were refused reciprocity certificates. The following colleges were represented:

| College | Year Grad. | Per Cent. |
|---|---|---|
| **PASSED** | | |
| Emory University | (1919) | 80 |
| Tulane University | (1919) | 84.5, 85.1, 81.7 |
| Johns Hopkins University | (1919) | 83.5, 86.8 |
| University of Maryland | (1918) | 81.2, 81.5, 83.1, 87.8, (1919) 80.1, 82 |
| University and Bellevue Hospital Medical College | (1918) | 89, (1919) 85, 88.3 |
| North Carolina Medical College | (1919) | 84.4 |
| Jefferson Medical College | (1917) | 83.4, (1918) 86.3, 88.1, 88.7, 89.5, 91.3, (1919) 81.4, 83.1, 83.4, 83.8, 84.5, 84.5, 85, 85.3, 85.8, 85.8, 86.5, 86.5, 86.7, 88.3, 89, 90 90.3, 91 * |
| University of Pennsylvania | (1918) | 89.5, 90.1, 92.5, (1919) 80, 84.5, 85, 85.4, 88, 88.1, 88.5, 89.1 |
| Meharry Medical College | (1918) | 88.4 |
| Medical College of Virginia | (1916) | 80.1, 83.3, (1918) 80.7, 83.7, (1919) 83, 83.3 |
| **FAILED** | | |
| Atlanta Medical College | (1916) | 72.3, ** |
| North Carolina Medical College | (1918) | 72.1 |
| Med. Coll. of the State of South Carolina | (1912) | 76.5 |
| Meharry Medical College | (1917) | 63.4, (1918) 66.5, 72.1 |
| University of West Tennessee | (1910) | 66.5 |
| Medical College of Virginia | (1916) | 77 |

| College | Year Grad. | Reciprocity with |
|---|---|---|
| **LICENSED THROUGH RECIPROCITY** | | |
| Rush Medical College | (1901) | Iowa |
| Keokuk Medical College | (1898) | Illinois |
| University of Louisville | (1913) | Indiana, (1915) Virginia |
| Tulane University | (1903) | Louisiana |
| College of Phys. and Surgs. Baltimore | (1893) | South Carolina, (1915) Massachusetts |
| Johns Hopkins University | (1899) | Illinois |
| University of Maryland | (1893) | Maryland |
| Harvard University | (1894), (1917) | Mass. |
| University of Michigan Medical School | (1914) | Michigan |
| Columbia University | (1911) | New York |
| Cornell University | (1906) | New York |
| North Carolina Medical College | (1910) | Virginia |
| Lincoln Memorial University | (1909) | West Virginia, (1911), (1916) Tennessee |
| Tennessee Medical College | (1904) | Tennessee |
| Vanderbilt University | (1894) | Tennessee |
| University College of Medicine, Richmond | (1912) | Virginia |
| University of Virginia | (1908) | Connecticut, (1909) Oklahoma |

** Did not complete examination.

* No grade given.

## Book Notices

THE ITINERARY OF A BREAKFAST. A Popular Account of the Travels of a Breakfast through the Food Tube and of the Ten Gates and Several Stations through Which It Passes, Also of the Obstacles Which It Sometimes Meets. By. J. H. Kellogg, M.D. Cloth. Price, $1.60 net. Pp. 210, with illustrations. New York: Funk & Wagnalls Company, 1919.

The publisher has characterized this "popular account of the travels of a breakfast through the food tube" as being "as fascinating as a romance or a book of travels." The book is in popular language, the intestinal tube being considered as a road with ten gates, with numerous stations and obstacles. The reader is enlightened with regard to the method of overcoming the obstacles and the way in which the food passes through the gates. Some of the views held by the author are not those generally held; for example, that limitation to a single evacuation daily must be considered as constipation, and that from three to four evacuations constitute the normal mode of living. Most of the views expressed are, however, of a common sense, practical character and exceedingly instructive. Particularly interesting are Dr. Kellogg's views on the use of the roentgen ray and interpretations derived therefrom in connection with examinations of the intestinal tract:

> A tyro misinterprets what he sees. The minute indications of disease he overlooks, and unusual but perfectly normal appearances he mistakes for cancer or some other dreadful condition, for which he urges immediate operation.
>
> Unfortunately the country is full of x-ray tyros, thanks to the commercial activity of x-ray machine manufacturers. It is safe to say that at the present moment the conclusions drawn from the majority of x-ray examinations of the colon are altogether unreliable and worthless, if not positively misleading, and a menace to the patient's welfare if made a basis for active treatment or operation.
>
> Beware of the x-ray tyro. There are in the United States possibly one hundred x-ray specialists whose examination of the alimentary canal may be regarded as of value and whose conclusions may be trusted as fairly reliable; but the chances are very great that our estimate is far too large.

The book is one which the physician will read with interest and the layman with considerable enlightenment. Whether the neurasthenic who is inclined to make a fetish of his intestinal evacuations can benefit from it seems doubtful.

MAMMALIAN PHYSIOLOGY: A COURSE OF PRACTICAL EXERCISES. By C. S. Sherrington, M.D., D.Sc., F.R.S., Waynflete Professor of Physiology in the University of Oxford. Cloth. Price, 12 shillings, 6 pence. Pp. 156, with illustrations. New York: Oxford University Press, 1919.

This is a laboratory outline of mammalian experiments given in a course of physiology at Oxford University. This course compares favorably with those of our better medical schools. Incidentally, the medical schools of Great Britain are handicapped, in teaching these sciences, in the restriction placed on the use of animals for teaching purposes. As the result, most of the experiments outlined in this book are done on decapitated animals. The book will be found helpful to teachers of physiology, pharmacology and physiologic chemistry.

CEREBROSPINAL FLUID IN HEALTH AND IN DISEASE. By Abraham Levinson, B.S., M.D., Associate in Pediatrics, Northwestern University Medical School. With Foreword by Ludvig Hektoen, M.D. Cloth. Price, $3. Pp. 231, with .56 illustrations. St. Louis: C. V. Mosby Company, 1919.

In his foreword, Professor Hektoen states that he believes this to be a valuable little book in which the author has combined a true philosophic interest with a first-hand practical knowledge. Why say more?

A TEXT-BOOK OF BIOLOGY FOR STUDENTS IN GENERAL, MEDICAL AND TECHNICAL COURSES. By William Martin Smallwood, Ph.D., Professor of Comparative Anatomy in the Liberal Arts College of Syracuse University. Third edition. Cloth. Price, $3. Pp. 306, with 243 illustrations. Philadelphia: Lea & Febiger, 1918.

Biology is fundamental to all the medical sciences. Professor Smallwood presents the subject from the point of view of the comparative anatomist and, as in most textbooks of biology, the frog is selected as the type for complex animals. The first seven chapters cover its anatomy and physiology. The second part of the book concerns the biology of unicellular organisms, taking up in turn the development of worms, plants, insects, biologic adaptations, bacteria, the biologic factors in disease, evolution, heredity and animal behavior. The book is excellently illustrated; the author has drawn on many sources for the pictures, and they help to make this an attractive textbook.

## Medicolegal

### Malpractice in Treating Injury to Brachial Plexus

(*Tucker v. Stetson* (*Mass.*), *123 N. E. R. 239*)

The Supreme Judicial Court of Massachusetts, in sustaining exceptions to a verdict in favor of the plaintiff, says that he met with an accident whereby he sustained a broken collar bone and a severe injury to the brachial plexus. He was taken to a hospital, where he was treated by the defendant. During the time he was in the hospital his arm and shoulder were bandaged up. He could move his fingers a little, but could not move his arm; and since that time he has never been able to make any other movement with the fingers or arm. At the end of three weeks he left the hospital at the defendant's suggestion, the defendant directing him to see another physician every day or so, telling him he thought his arm would come on all right in a couple of months or so. The plaintiff went to the other physician every other day or so and had his arm rubbed with a liniment of some kind, and then put back in its bandage, the physician telling him to massage it himself once or twice a day, which he did, but noticed no change in the feeling or sensation of his arm as he followed this course of treatment. After six weeks of treatment his arm began to wither up. He then went to the Massachusetts General Hospital, and was operated on unsuccessfully. The arm at the time of the trial was useless.

The claim of the plaintiff, as set out in the declaration, was "that the defendant carelessly and negligently failed to operate on the injured parts of the plaintiff's body seasonably and that he failed to exercise that judgment which he professed to possess in the treatment of the plaintiff's injuries." At the close of the evidence the presiding judge refused to direct a verdict for the defendant; and this court thinks the ruling was right. The defendant testified that he had practiced surgery since 1895; in 1901 became examining physician and surgeon for important railroads; had done some postgraduate work devoted to surgery; had a large and varied practice; but "had never performed an operation to relieve any trouble with the brachial plexus, though he knew what it was and appreciated the effects of injury to it and considered himself competent to pass on whether the brachial plexus had been affected, and was satisfied in his own mind the following day after the accident that the plaintiff had trouble with the brachial plexus and treated him keeping that fact in mind." The evidence fully warranted the jury in finding that ordinary surgeons in the town where the defendant practiced his profession had the skill and ability to perform the surgical operation of "cutting down on the nerves and suturing or sewing them together as far as possible in their normal position." The conflicting testimony warranted a finding that such an operation, performed a few days after the injury, would probably have restored the use, or some of the use, of the arm. It also warranted a finding that the defendant did nothing for the plaintiff except to have a sand bag placed on his shoulder, have a roentgenogram taken, dress the arm with cotton bandages, and keep him in bed on his back during the time he was at the hospital, without advice that an operation was desirable or a suggestion that he could or should obtain the services of the best surgeons at the Massachusetts General Hospital. The foregoing facts, if believed, warranted a finding that the defendant was negligent in failing to operate or in failing to advise seasonably to procure surgical relief if the defendant felt himself incompetent to act.

But there was prejudicial error, the court thinks, in an instruction to the jury that it might take into consideration the possibilities of good results from an operation in determining whether the plaintiff had proved his case. The liability of the defendant was not to be determined by the jury on consideration of contingent, speculative and possible results of an operation which might be performed on the plaintiff to remedy or mitigate the consequence of the injury to the nerves, but on proof by a fair preponderance of evidence that it was reasonably probable that such a result would follow an operation, performed by the defendant with the ordinary skill and ability of surgeons practicing in towns similar to the one where he undertook to practice his profession.

### Power of Personal Representative to Waive Privilege

*(Grieve v. Howard (Utah), 180 Pac. R. 423)*

The Supreme Court of Utah, in reversing a judgment that dismissed the complaint of the plaintiff, a special administrator, who sought to have a deed that had been made set aside on the ground of mental incapacity of the grantor and undue influence, says that it was held on the trial that a physician called by the plaintiff as a witness could not reveal matters which he had learned in his treatment of the grantor, who had died; and that the apparent conflict in the former decisions of this court in regard to the power of the personal representative of a deceased patient to waive privilege rendered it necessary to determine definitely the rule by which future cases should be governed in Utah. The exact question was: Can the personal representative of a deceased person, under the Utah statute, waive the privilege conferred by the statute, and demand that the physician who attended the deceased prior to his death be permitted to testify concerning information acquired necessary to enable him to prescribe or act for the patient? The statute reads:

> There are particular relations in which it is the policy of the law to encourage confidence and to preserve it inviolate. Therefore a person cannot be examined as a witness in the following cases: . . . (4) A physician or surgeon cannot, without the consent of his patient, be examined in a civil action as to any information acquired in attending the patient which was necessary to enable him to prescribe or act for the patient.

The authorities are uniform, under all the statutes with which this court is familiar, that the patient can waive or withhold the privilege where the question arises during his life. But the question here was, Can his personal representative, after the death of the patient, waive the privilege the same as the patient could have done if living? The Utah statute and most other statutes are not express on this particular point, and for that reason there is considerable conflict of authority, not so much among text writers as among adjudicated cases.

The statute under consideration was adopted literally from the California Code of Civil Procedure as early as 1884, and *In re Flint*, 100 Cal. 391, 34 Pac. 863, decided in 1893, it was held that the privilege is personal to the patient, and after the death of the patient cannot be waived by his personal representative. But, after carefully considering the language of the statutes and the cases decided under them, referred to by the California court in the Flint case, this court confesses its inability to understand on what theory the California court or any other court can consistently hold that the differences in the statutes justify the differences found in the conflicting opinions referred to. It seems to this court that it would be far more ingenuous to admit that the statutes referred to, including the Utah statute, are all substantially the same in meaning and effect, and that the conflicting opinions of the courts are due entirely to conflicting views of different minds concerning the same subject.

In view of the state of the law as this court finds it, and this court's own convictions of what is most reasonable and just, this court is of the opinion that under the Utah statute the personal representative of a deceased person has the same right to waive the privilege given by the statute, after the death of the patient, as the patient would have had if living.

# *Society Proceedings*

## COMING MEETINGS

Medical Society of Hawaii, Honolulu, Nov. 29-30, Dec. 1.
Society of American Bacteriologists, Boston, Dec. 30-31.
Southern Minnesota Medical Assn., Mankato, Dec. 1-2.
Southern Surgical Association, New Orleans, Dec. 16-18.
Western Surgical Association, Kansas City, Mo., Dec. 5-6.

## CLINICAL CONGRESS OF AMERICAN COLLEGE OF SURGEONS

*Ninth Annual Meeting, held in New York, Oct. 20-24, 1919*

The President, Dr. William J. Mayo, Rochester, Minn., in the Chair

### Gunshot Fractures of the Femur

Sir Anthony Bowlby, London, England: Gunshot fracture of the femur occurs in 1.5 per cent. of all wounded men. It is one of the most dangerous injuries of the war, the danger being proportionate to the extent and nature of the injury of the soft parts even more than to the extent of the bone lesion. With the adoption of the "Thomas outfit," the transportation of the patient to the casualty clearing station was greatly simplified. Pain was either altogether prevented or reduced to a minimum, bleeding was soon checked, and the steadying of the fragments effectually prevented further injury to the soft tissues and spread of sepsis. The conditions necessitating primary amputation are complete smashing of an area of bone; extensive comminution of the lower articular end of the femur; laceration of the femoral vessels; extensive destruction of muscles and skin, and gas gangrene. Primary amputation for fracture of the femur is attended with a much higher death rate than is amputation in the thigh for injuries of the leg, and also the higher up the limb is removed the greater the mortality. Primary amputation at the hip is so uniformly fatal that it would better not be performed at all. The apparatus employed should be a skeleton metal splint which permits traction to be applied either directly downward or else in various degrees of abduction and flexion. The direction of traction and the amount of flexion must be guided by frequent roentgenograms. Even when the fragments are separated by an interval of 1 or 2 inches, the gap will be completely filled in by new bone. Fixed extension proved not to be as good as continuous extension. Movements of the knee joint are begun early, and slight flexion of the knee is to be preferred to traction on the fully extended limb. When union is sufficiently advanced it is the custom to get the patient out of bed while maintaining the length of the limb by the application of "walking caliper splints" fixed to the heel of the boot. The question of the removal of bone was not entirely settled when the war ended. There seems to be no doubt that, on the one hand, the removal of all fragments which might necrose hastens the healing of the wound, while, on the other hand, the removal delays the healing of the fracture, and in the opinion of some has been responsible for permanent nonunion in not a few cases. In fractures of the shaft it is important to support the bone at the site of fracture so that the natural anterior curve of the femur is very fully maintained or even slightly exaggerated. Stiffness of the hip joint should never occur, except in cases in which the fracture involves either the neck of the bone or the trochanter. This can always be prevented if care is taken that the foot is not cramped in bandages. It has been the custom recently to remove sequestrums earlier than in former years.

#### DISCUSSION

Sir Robert Jones, Liverpool, England: In England we obtained an average of only one-fourth inch shortening in those cases treated with calipers. In our experience at Liverpool the average shortening was five-eighths inch. This carries an important lesson. All those patients were treated in the simplest possible fashion, with Thomas splints or those similarly made. None of these patients were subjected to internal splinting. In the early part of the war the men subjected to internal splinting all lost their limbs. When

caliper splints are worn, the patient with an ununited fracture can walk with ease. The patient with a gap in his femur can walk without limping. Deformity resulting from slight overlapping is not as bad as that resulting from a meticulous apposition. When there is deformity of the femur we do not operate if there is good function and good alinement, even if there is as much as one inch shortening. If one operates on a malunion there is often a greater stiffness of the knee than before. A knee at 5 degrees flexion is bandaged at 20 degrees; when the patient can lift the limb to 20 degrees of flexion, it is bandaged at a still greater degree of flexion. It is not advisable to attempt forcible movements.

DR. FRED N. G. STARR, Toronto, Ont.: Recently I came across the original article written by Thomas in 1875, in which he stated that the splint he had devised enabled one to "handle the patient as though he were a toy, without pain." I have seen that so often that I am thoroughly convinced of the value of the Thomas splint. All accident ambulances should be equipped with Thomas splints, and the men in charge should be taught how to apply them at the site of the accident.

### Empyema: Its Pathogenesis and Treatment

DR. ALEXIS V. MOSCHOWITZ, New York: Knowledge of the pathology and pathogenicity of empyema is necessary, in order to understand its treatment. The view has hitherto been held that the pleurae became infected by contiguity with the lung. That does not seem logical, because such a thing does not take place in other serous cavities. It seems as if contamination must occur from the pleura. In most cases a subpleural abscess is found connecting with the empyema cavity. This is the rule rather than the exception. There is a rupture of the subpleural pulmonary abscess. Irrigated by an irritating solution, a persistent cough is produced. The analogy between the pleura and the peritoneum is very close, differing only with the greater mobility of the lung, as compared with the sluggish peritoneal peristalsis. The stages observed are: Serous pleurisy is converted into exudate, then encapsulization occurs, which might be either diffuse, localized or multiple. Seropurulent pleurisy is not encapsulated, but purulent pleurisy is always so. An absolutely free empyema containing frank pus is an unknown quantity. Frank pus is usually an end-product. The reason why thoracotomy is not permissible in the early stage is this: The fluid runs out and atmospheric pressure, at 15 pounds to the square inch, rushes in, collapsing the lung. This is badly borne by the patient and causes fluttering of the mediastinum with rapid heart action. It pushes out the other lung and disables the heart. Thus early thoracotomy is attended by a terrible mortality. When the stage of adhesions has been reached, these form an anchor for the lung to the side of the chest. It is then safe to operate and evacuate the pus. An acute pyopneumothorax is different. These patients bear early operation. The statistics as to the use of surgical solution of chlorinated soda are rather rosy, but some patients remain cured. In cases in which a pneumothorax occurred, this tended to disappear. It is safe to sterilize the cavity and close it over a pneumothorax.

#### DISCUSSION

DR. JOHN L. YATES, Milwaukee: Anything foreign to the serous membrane is an irritant. This irritation provokes an acute serous reaction. Before adhesions form, the serous fluid has formed and penetrated the cavities. This is sufficiently irritating to provoke a serofibrinous reaction apart from bacteria, and secondary foci may become more acute than the primary one. The best prevention of empyema is in keeping the pleural serosa in constant apposition. Drainage should be done later, when the secretions have coagulated. Primary thoracotomy can be done only by maintaining pulmonary inflation.

DR. JAMES F. MITCHELL, Washington, D. C.: The profession has agreed that early operation is dangerous in streptococcic empyemas. It has been found that pressure in one side of the chest is not independent of pressure in the other. There is a definite relation between the opening and the amount of air in the lungs. When the lung is restricted by pneumonia, the size of opening compatible with life becomes smaller. Adhesions render the opening safer. Attention to diet and early exercise are found to be most important therapeutic aids. Three points can be emphasized: (1) avoidance of early operation; (2) vigorous application of the Carrel-Dakin method; (3) attention to diet and exercise. Persistent cases should be subjected to roentgen-ray examination. Stereoscopic plates should be made both with and without bismuth, because the bismuth may obscure a foreign body. The chest wall may be closed regardless of an existing cavity, provided the latter is sterile. The cavity tends to disappear with expansion of the lung. The operation should be as simple as possible. Slough should be removed. Small flaps should be used to close the opening. Early exercise should be instituted. There are few cases that will not respond to comparatively simple operations. All the individuals we treated became able-bodied men, without subsequent deformity.

### Surgical Treatment of Exophthalmic Goiter

DR. GEORGE W. CRILE, Cleveland: Of 2,250 thyroidectomies, 50 per cent. were subjected to ligations. In 333 cases, ligation was first done, then a thyroidectomy. Among 116 ligations, one death occurred in the stage of dissolution. In the first 100 cases the mortality was 16 per cent. With the use of gas and oxygen anesthesia this was reduced to 2.5 per cent. By the adoption of special management of cases, the mortality has been further reduced to 0.6 per cent. Since the war, special precautions have been added against postoperative hyperthyroidism due to excessive chemical activity and destruction by oxidation. With each degree of rise of temperature this chemical activity is increased 10 per cent. With a temperature of 106 F., metabolism is increased 70 per cent. Another point of importance was the discovery by the British research department that the wound can be left open in statu quo, by the use of a dressing of 1:5,000 flavine. This permits the surgeon to stop at any point at which he considers the patient is not enduring the operation well. Lobectomy is performed under analgesia, as the inhalation anesthesia interferes with internal respiration in a patient already suffering from suboxidation. Hypersensitiveness is sufficient to destroy the patient. Complete team work is essential to success. The operation is performed by the hospital and not by the surgeon. The differential diagnosis is greatly aided by the Goetsch epinephrin test and basal metabolism determination.

#### DISCUSSION

DR. DEAN D. LEWIS, Chicago: Tachycardia without exophthalmos does not differ from ordinary thyreotoxic goiter. Hyperplasia of the thyroid epithelium presents the four classical signs of goiter. Surgeons are likely to want to operate too soon. The exercise of judgment makes all the difference between one surgeon's success and another's lack of it. I have seen patients die after ligation. I have not seen anything that will control that.

DR. CHARLES H. MAYO, Rochester, Minn.: The Surgeon-General's report showed that 15 per thousand is the rate of goiter in the northern Pacific states. There is almost no goiter in New Hampshire and Vermont. There are perhaps more mistakes in diagnosing exophthalmic goiter than any other condition. The thyroid is not essential to life, but it is synonymous with making life worth living. The cell changes in the thyroid are due to increase of biochemical products by bacteria, coming from different parts of the body and acting on the thyroid. Two thirds of the cases are simple hyperplastic glands. A second type is caused by areas of degeneration throughout the gland. A hyperplastic gland sometimes goes with myxedema—a sort of burned-out condition. In hyperthyroidism there is a burning of fats, a rapid oxidation, and these people literally destroy their own cells. The thyroid gland bears relation to the elimination of nitrogen. Nitrogen, if retained, leads to tetany. Creatin and creatinin have almost the same chemical constitution as the thyroid secretion. There is, however, no positive determining factor to tell what is the controlling influence in thyroid action. We do not all agree as to methods, but the important point is that the mortality has been brought down.

*(To be continued)*

## MEDICAL SOCIETY OF THE STATE OF PENNSYLVANIA

*Sixty-Ninth Annual Meeting, held in Harrisburg, Sept. 22-25, 1919*

*(Concluded from page 1550)*

### Prevention of Communicable Respiratory Diseases Based on Observations in U. S. Army Camps

DR. ORLANDO H. PETTY, Philadelphia: Personal hygiene was taught on all occasions. Special emphasis was placed on droplet infection, and the men soon learned to report their comrades for isolation on the evidence of acute colds. In the prevention of infection, the properly fitted gauze mask, exchanged when soiled, was probably the most valuable preventive agent. The value of bacterins in the prevention of communicable respiratory diseases has not been proved. Prevention is accomplished, not by the injecton of polyvalent preventives, but by the tireless enforcement of the difficult procedures of sanitation, hygiene and preventive medicine.

DISCUSSION

DR. M. HOWARD FUSSELL, Philadelphia: There is no easy road to the prevention of respiratory diseases. So far as we know, the diseases which we can prevent most readily are smallpox, typhoid and, possibly, pneumonia. If we should promptly isolate cases of ordinary infectious colds we would greatly limit cases of respiratory disease. Dr. Petty's stand regarding bacterins is extremely sane. I myself am not sure that the bacterins are entirely harmless.

DR. CHARLES A. E. CODMAN, Philadelphia: The sanitation of the army camps is applicable to civil practice. The value of bacterins is yet to be demonstrated. The mask which seemed to us the most valuable was the ordinary chloroform inhaler, placed over the nose and fastened with elastic bands about the ears. Moistened with mercuric chlorid solution, it was efficacious.

DR. ARTHUR C. MORGAN, Philadelphia: The remarkable advance in the medical work of the army, made between 1898 and 1919, is not due to the regular army men alone, but in large part to the reserve corps men. The young members of medical detachments received lessons which should make them 100 per cent. efficient health officers. I would recommend that for a health officer a good young fellow be selected who has had his training in the medical department of the army.

DR. C. P. BROWN, Ambler: While it is not definitely proved that the pneumococcus vaccine is the answer to pneumonia, certainly it is entitled to much more extended use than it has received.

### Value of Early Diagnosis of Pleural Effusions

DR. S. A. SAVITZ, Philadelphia: To my mind, percussion is the dependable practice, and its variation on change in posture is the cardinal sign. Palpation and auscultation are of little value. The frequent use of the aspirating needle is important. An individual with a pleurisy who is discharged too soon, or with a pleurisy unrecognized, undoubtedly has a passive lesion which may become active. Too much emphasis cannot be laid on the importance of keeping such patients under observation for a long time. By doing so, especially in conjunction with the surgeon, tuberculosis will be diminished greatly.

DISCUSSION

DR. ARTHUR C. MORGAN, Philadelphia: Pleurisy with or without effusion does not mean the "predisposition" to tuberculosis; it means that the patient is really the subject of tuberculosis. I have had remarkable results from auscultation of the chest in pleurisy with effusion.

DR. JOSEPH SAILER, Philadelphia: That simple puncture is not unattended with danger should be emphasized. We had two deaths from simple puncture at Camp Wheeler. Necropsy disclosed no other cause of death. Even if all cases of pleurisy are tuberculous, which I think is an overstatement, many cases of pleurisy can be tapped and the patient be healthy for a long series of years.

DR. CHARLES A. E. CODMAN, Philadelphia: The differential diagnosis between some pneumonias and pleurisies is extremely difficult. In diagnosis too great dependence must not be placed on one method. Percussion and auscultation are most valuable, and at times it is essential to use the needle, the roentgen ray and the fluoroscope.

DR. W. G. TURNBULL, Cresson: In tuberculosis, patients have developed empyema, not as a necessary part of pulmonary tuberculosis, but as the result of unwise aspirations of pleural effusions.

### Pulmonary Syphilis

DR. ELMER H. FUNK, Philadelphia: Syphilis of the lung commonly manifests itself as a gumma, usually near the root or in the lower lobes. These gummas may occasionally break down and form small cavities, or be converted into fibrous tissue, and the resulting contraction may distort the lung and give rise to bronchiectasis. The gumma may be latent and be found at necropsy. Syphilis of the lung occurs more often than the older observers would have us believe, and than postmortem evidence indicates. I believe that patients have perished from pulmonary syphilis improperly treated under a mistaken diagnosis of pulmonary tuberculosis or other condition.

DISCUSSION

DR. EDWARD J. G. BEARDSLEY, Philadelphia: In a case of seemingly advanced tuberculosis, sputum examinations had been negative for tubercle bacilli. The patient's blood gave a ++++ Wassermann test. On the forty-second sputum examination, myriads of acid fast bacilli were found.

DR. WILLIAM A. WOMER, New Castle: In a case in which repeated examinations for bacilli in the sputum were negative a history of chancre was obtained. After thorough antisyphilitic treatment, the condition cleared up, and the man today seems to be in perfect health.

### Cardiovascular Phenomena Associated with War Neuroses

DR. GEORGE MORRIS PIERSOL, Philadelphia: Medical officers are in accord that chronic organic disease of the heart played an inconspicuous rôle among the medical casualties of the American Expeditionary Forces. Of 3,752 medical cases in one base hospital, only twenty-four were definite examples of organic heart disease. This incidence, however, by no means represented the number of apparently healthy soldiers in whom, from time to time, systolic murmurs were observed. Approximately 4,000,000 soldiers were examined by the cardiovascular boards, and about 38 per cent. of all rejections for physical disability in all the drafts was on account of circulatory disease. The weight of evidence strongly suggests that the symptoms of effort syndrome depend on a neurosis. An opinion held by neurologists is that effort syndrome is a neurosis in which cardiovascular manifestations predominate. It would seem justifiable, therefore, to regard effort syndrome as the result of the reaction of an unstable nervous mechanism to anxiety and overstrain, producing a neurosis associated with cardiovascular symptoms. After the signing of the armistice, effort syndrome was difficult to discover.

### Significance of Heart Murmurs

DR. EDWARD H. GOODMAN, Philadelphia: Murmurs are largely useful as a peg on which to hang a diagnosis. As an index of the degree of valve damage, they are worthless prognostically, except in mitral stenosis. Diastolic murmurs are always serious murmurs. Unless one recognizes the fact that the murmur is not always found, and unless one is able to suspect the diagnosis in the absence of murmur, many cases of stenosis will be pronounced sound. With systolic murmurs, diagnosis is more difficult. Many practitioners are stigmatizing individuals with such murmurs with the diagnosis of valvular heart disease and thereby condemning them to a life of semi-invalidism. While it is important to distinguish between the innocent systolic murmurs and those which are not, the greatest importance here as in diastolic murmurs attaches to the behavior of the muscle. By an estimation of its efficiency we shall regard murmurs in their true light.

DISCUSSION

DR. A. E. ROUSSEL, Philadelphia: Systolic murmurs have a relatively greater importance after than during the second and third decades of life. Presystolic and diastolic murmurs are important because they denote heart changes rendering

the subjects poor risks. No one has a right to call a murmur organic unless there are signs of compensatory hypertrophy. In mitral stenosis the amyl nitrite test is of particular value. In the suspected case the patient breaks a capsule of amyl nitrite and passes it in front of his face. In many instances the murmur comes out, whereas before it had been only suspected.

DR. CHARLES REA, York: In the difficulty of determining the presence of a presystolic murmur a helpful principle to me is that when there is uncertainty of just when the first sound begins, a presystolic murmur is present.

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## AMERICAN PUBLIC HEALTH ASSOCIATION

*Forty-Seventh Annual Meeting, held in New Orleans, Oct. 27-30, 1919*

*(Concluded from page 1548)*

### Cure of Infected Persons as a Factor in Malaria Control

DR. C. C. BASS, New Orleans: Malaria may be eradicated either by destroying the mosquitoes capable of transmitting the infection or by destroying the infection in man, the only other host of malaria parasites. Theoretically, it would be possible to eliminate malaria from a region by disinfecting all infected persons in the region. This would result regardless of the abundance of mosquitoes, if all infected persons were cured. There would then be no malaria for mosquitoes to transmit. Practically all physicians relieve their patients of active clinical symptoms of malaria, but few actually disinfect their patients. In the experiments in Mississippi, the data obtained indicate that between 50.77 and 68.86 per cent. of all persons who have attacks of malaria during a given year have relapses and not new infections. The standard, practical method of treating and disinfecting persons who have malaria, adopted in the Mississippi experiments, is: under 1 year of age, ½ grain of quinin; 1 year, 1 grain; 2 years, 2 grains; 3 and 4 years, 3 grains; 5, 6 and 7 years, 4 grains; 8, 9 and 10 years, 6 grains; 11, 12, 13 and 14 years, 8 grains; 15 years and older, 10 grains. This treatment appears to disinfect more than 90 per cent. of patients.

If all persons who know they have malaria and treat themselves should employ a method of treatment which disinfects them, and if those who are treated by physicians are treated so as to disinfect them, we would have, theoretically, 55 per cent. of reduction in the prevalence of malaria each year. The only way by which all persons who have malaria in a given locality can be found is by intensive malaria surveys. Those who give positive histories during the previous twelve months should be considered probably still infected and therefore should take the necessary treatment to disinfect them. Experiments in malaria control were conducted in Bolivar County, Miss., under the auspices of the Mississippi State Board of Health, as a result of which, treatment and methods of carrying out this more or less intensive method of malaria control were worked out. The reduction indicated by a resurvey of a large part of an area of 100 square miles just one year from the first survey was 89.9 per cent.

### Present Methods of Anopheles Drainage and Anopheles Control

MR. J. A. LEPRINCE, Memphis, Tenn.: It is to be hoped that, within a few years, communities desirous of freedom from malaria and the mosquito pest will install adequate permanent drainage systems. Where conditions are favorable, the drainage system should be planned to eliminate the necessity of supplementary measures, such as oiling and maintenance of open ditches. In many localities, effective screening of houses is the best preliminary procedure for malaria control; but it would be more economical and satisfactory to install permanent drainage systems and obtain permanent benefits at a reasonable cost.

### Mosquito Work of the Bureau of Entomology

DR. D. L. VAN DINE, Mound, La.: In the summer of 1913, a project was undertaken by the bureau dealing particularly with the mosquitoes concerned in the transmission of malaria in this country. A laboratory for the purposes of this investigation was established in the delta region of the Mississippi valley at Mound, La., where the anopheles mosquitoes and malaria are prevalent. One result of this project has been given in the conclusions on the loss in crop returns from malaria. The amount lost in crop returns is equivalent to a direct annual tax of $3.88 per acre on the land under cultivation. It is estimated that the total average cost per acre to bring permanent swamp land into cultivation is $17. The screening of dwellings has been an important factor in the reduction of malaria when the screening work has been done thoroughly and proper use has been made of the protection afforded. Dr. Howard estimates that the people of the United States spend $10,000,000 every year for screening against flies and mosquitoes, and concludes that if this enormous expense is at all necessary, it should be done thoroughly. The individual use of mosquito bar over beds is a more promising protection against malaria infection than screening the house among the tenants. One careless member in a household will offset the care taken by all other members in a screened house; but the mosquito bar protects the individual. It also implies no reconstruction of buildings, and places no restrictions on the movement of individuals from point to point.

### Resolutions

Resolutions were adopted opposing legislation prohibiting the use of dogs for scientific purposes; urging the appointment of committees in the several countries represented in the association by their federal governments to study existing methods for the preservation and improvement of health of the people, such as hospital facilities, public health activities, charitable institutions and compulsory health insurance, with the view of reporting some adequate plan for coordinating the already existing activities and for the existing application of scientific and social agencies for accomplishing the desired ends; urging the enactment of legislation which will increase substantially the pay of the officers of the U. S. Public Health Service; to set a national medical examination week during May, 1920; to cooperate with the U. S. Public Health Service in carrying out the provisions of the act to provide for the care of persons afflicted with leprosy and to prevent the spread of leprosy in the United States; to assure for the future a national health program and a coordinated federal health administration; to appoint a committee to study the needs of the national health situation and to confer with other agencies having the same object in view, and to secure the appointment of a special congressional commission for a survey of federal health activities along the general lines of the France-Denison resolution; to commend the work of the U. S. Army and Navy in combating venereal diseases during the war; and, in view of the importance of thorough eradicative measures for the contol of plague among the ground squirrels of the Pacific Slope, urging Congress to appropriate $1,000,000 to be expended by the U. S. Public Health Service in this work.

### Influenza Mortality Among Wage Earners and Their Families

LEE K. FRANKEL AND LOUIS I. DUBLIN, New York: White rather than colored people were attacked by the pandemic of influenza, and the young rather than the old, a reversal of usual conditions. The 70,729 deaths included in this study were largely concentrated during October, November and December, 1918. October alone showed 34,471 deaths, or nearly one half of all the deaths in the entire period. In October, the death rate was 3,395 per hundred thousand; in November, 1,035, the figures declining rapidly thereafter, with a slight halt, however, in February and March. During the period 1911 to 1917, considering these seven years as a norm, there was an annual influenzal pneumonia rate of 125 per hundred thousand. On the basis of the rate for the year ending September, 1918, there would have been only 13,891 deaths, as against the 70,729 that actually occurred. From 1911 to 1917, the mortality rate showed an excess of 18 per cent. males over females among white lives, and of 30 per cent. among colored lives. For the period from October, 1918, to June, 1919, the excess of males over females among the

whites was only 3 per cent., and there was no excess at all among colored lives. From 1911 to 1917, influenzal pneumonia showed an excess of 72 per cent. colored males over white males, and of 56 per cent. colored females over white females. During the period of the epidemic, the situation was reversed. The colored males showed a rate of 1,522 per hundred thousand, as compared with a rate of 1,844 per hundred thousand for white males.

## Current Medical Literature

### AMERICAN

Titles marked with an asterisk (*) are abstracted below.

### American Journal of Physiology, Baltimore

Oct. 1, 1919, 50, No. 1


*Acidosis During Starvation. H. Asada, Tokyo.—p. 1.
*Studies on Extract of Lung. K. Kakinuma, Tokyo.—p. 9.
*Vital Staining and Acidosis. H. Asada, Tokyo.—p. 20.
*Studies in Secondary Traumatic Shock. IV. Blood Volume Changes and Effect of Gum Acacia on Their Development. H. S. Gasser, J. Erlanger and W. J. Meek, St. Louis.—p. 31.
*Catalases of Blood During Anesthesia. S. P. Reimann and C. E. Becker, Philadelphia.—p. 54.
*Physiology of Stomach. LI. Control of Pylorus. A. B. Luckhardt, H. T. Phillips and A. J. Carlson, Chicago.—p. 57.
Physiologic Studies on Planaria. II. Oxygen Consumption in Relation to Regeneration. L. H. Hyman, Chicago.—p. 67.
*Effect of Anesthesia and Operation on Certain Metabolites. S. P. Reimann and F. L. Hartman, Philadelphia.—p. 82.
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**Acidosis During Starvation.**—In his studies on acidosis during starvation, Asada used Van Slyke and Cullen's method for plasma bicarbonate determinations. On the first and second days of starvation the plasma bicarbonate in the arterial blood of rabbits showed a drop from the normal value. On the third day of the fast there was a second rather sharp fall, after which there was no change until the ninth day. On the tenth fasting day there occurred a third rather moderate fall, after which no further marked change took place until the end of life. Generally, the arterial plasma of rabbits has 55 volume per cent. of carbon dioxid. The first fall is about 5 volume per cent., the second about 10 and the third about 6 volume per cent. The amount of carbon dioxid in the arterial plasma is influenced considerably by the condition of the animals. After one extraction of 10 c.c. blood from the carotid, the acidosis seems to be conspicuously increased, because by the second extraction the amount of carbon dioxid is always less than that of the first extraction on the same fasting day. In the moribund state a contrary result is obtained, i. e., the amount of carbon dioxid in the arterial plasma does not decrease but increases. This is also the case in the arterial plasma immediately after death. In Asada's opinion this increase is not due to bicarbonate, but rather to an accumulation of carbon dioxid caused by the failure of the circulatory as well as the respiratory functions. The rate of the loss of body weight is subjected to wide individual fluctuations which may or may not be influenced by the blood extraction. The animals lived in the state of an absolute fast for from eleven to twenty days and at the end of life had lost from 27.69 to 52.37 per cent. of their initial weight. Microscopically, many organs showed cloudy swelling, vacuolarization and atrophy. There was invariably an intensive congestion in every glandular organ, but fatty degeneration was found almost in no case.

**Studies on Extract of Lung.**—The toxic action of lung extract and means for neutralizing this action were made the objects of Kakinuma's investigations. He found that intravenous injection of beef lung extract into guinea-pigs invariably causes dyspnea and, in a majority of cases, convulsions as well. The minimal lethal dose of the beef lung extract for guinea-pigs on intravenous inoculation varied from 0.02 to 0.15 c.c. per 100 gm. of body weight. Glucose destroys the toxicity of lung extracts. Thus 1.0 c.c. of 10 per cent. glucose mixed with the minimal lethal dose of lung extract renders the latter inert. Hypodermic injection of epinephrin immediately before an intravenous lethal dose of lung extract was protective in effect. Intravenous injection of lung extract caused a slight increase in the blood sugar of rabbits.

**Vital Staining in Acidosis.**—The vital staining method by injection of lithium carmin solution into the ear vein of living animals was studied by Asada. He found that vital staining cannot be accomplished by a single intravenous or intraperitoneal injection of lithium carmin in subtoxic doses in a healthy animal. If, however, an acidosis be first established, a single injection of the dye will give a satisfactory stain. In animals which have been vitally stained, an actual decrease in plasma bicarbonate occurs. Hence, the conclusion is drawn that it is incorrect to predicate the existence of specific stain taking substances or granula in the cells. Rather, vital staining with lithium carmin is due to the development of an acidosis which so alters the function of the body cells that the diffusing dye is deposited in the granula. This deposition corresponds to the precipitation from colloidal solution of the dye when the normally alkaline solution is made acid in vitro.

**Studies in Secondary Traumatic Shock.**—Experiments were made by Gasser and his associates to determine the rôle that the absolute volume of the blood plays in the reduction of the effective volume in shock, and to evaluate the possible modes by which such a reduction might be brought about. Four forms of experimental shock were studied, namely, those produced by injections of massive doses of epinephrin; by clamping the vena cava above the liver for a period of three hours so that the general arterial pressure was 30 to 40 mm. of mercury; by clamping the abdominal aorta above the celiac axis for a period of three hours so that the distal pressure was 30 mm. of mercury and by exposure and manipulation of the intestines. The blood volume was found to be decreased in all forms of experimental shock studied and after all grades of damage. Red cell counts or hemoglobin determinations were of value in indicating blood volume only when no absolute stasis occurred and when no corpuscles were jammed in the capillaries. The effective volume of the blood may be reduced in the following ways: 1. By decrease in the volume of the blood as the result of: (*a*) transudation of plasma; (*b*) transudation of plasma and jamming of the corpuscles in the capillaries and venules, or the latter combined, with (*c*) absolute stasis in some part of the vascular system, and (*d*) hemorrhage into tissue, especially into the lumen of the intestines. 2. By dilatation of the capillaries and small veins with greatly decreased slowing of the circulation. This is always attended by some loss of plasma, but the latter may be relatively inconsiderable. The transudation of plasma is greatly opposed by the injection of 4 c.c. per kilogram of 20 per cent. acacia before traumatization. The mechanism of action is believed to be due mainly to the antagonism to filtration by the resulting increase in the osmotic pressure of the plasma colloids.

**Catalases of Blood During Anesthesia.**—Estimations of the catalases of the blood were made by Reimann and Becker before and after anesthesia. They were decreased in 65 per cent. of the cases and increased in 35 per cent. The methods for the determination of catalases have been criticised and the opinion expressed that they are inaccurate, and that no deductions can be drawn from them. The authors' results before and after anesthesia come within the experimental error. The functions of catalases in the body are unknown.

**Control of Pylorus.**—Evidence is presented by Luckhardt and others on the basis of experimental work on man and dog that there is a correlation between marked motor activity of the stomach (either as tonus changes or peristalses) and an inhibition in tone of the pyloric sphincter. The intragastric contents issuing from the duodenostomy were usually acid toward phenolphthalein but rarely showed presence of free acidity to dimethylamidoazobenzene or congo red. It seems probable to the authors that even under normal conditions the chemical control has been greatly overemphasized to the exclusion of other possibilities. Another important finding was the fact that vomiting is more easily induced by irritating the duodenal mucosa than by an irritation of the gastric mucosa.

**Effect of Surgical Procedures on Metabolites.**—A certain few surgical patients show uncompensated acidosis after anesthesia and operation. These studies were made by Reimann and Hartman to show, if possible, changes in the nitrogen metabolism. About ninety patients were observed. The urinary acidity was increased very definitely in every case until in some instances, almost half normal acid was excreted. The blood urea and nonprotein nitrogen were increased in every case. In the urine the general tendency of the ammonia was to increase, whereas the excretion of urea was either increased or diminished, with apparently no relation between the urea in the urine and in the blood. The question of retention or increased production suggested itself in the case of the increase in the blood urea and nonprotein nitrogen.

**Experimental Surgical Shock.**—All the more important methods of treating under standard experimental conditions a state that exhibits the clinical signs of surgical shock which is produced by the exposure of the abdominal viscera of a dog, under a constant ether anesthesia, until blood pressure decreases to the desired level, were tested by Mann. The therapeutic measures were tested after the viscera had been replaced and after determining the curve of the blood pressure. The value of the classical use of heat as well as the effect of cold in helping to produce the condition, was corroborated experimentally. Experimentally, rebreathing was not found to be of importance. None of the drugs usually employed in the treatment of shock were found to be very effective. The best results in the treatment of experimental shock were obtained by the injection of fluid media. The data of the experiments justify the conclusion that none of the artificial solutions give such good results as the use of blood. The so-called colloidal solutions and their various modifications give better results than physiologic sodium chlorid solution, but their potency is certainly not equal to blood or blood serum and occasionally they might be harmful.

**Increased Intracranial Pressure and Elevation of Body Temperature.**—The results obtained by Moore in her experiments support the view that temperature regulation is dependent on physicochemical factors without the intervention of hypothetical "heat centers." The rise in body temperature and other symptoms attending increased intracranial pressure correspond so closely to those of "heat puncture" in which there is generally sufficient brain lesion to cause an increase in pressure in the brain cavity, and those of clinical brain lesions, that it seems possible to apply the same explanation to each of these cases. Moore thinks the rise in temperature which is reported by advocates of the "heat center" theory as being due to "heat puncture" can be explained in a like manner, as can also the rise obtained in 22 per cent. of her punctures and the fatal symptoms in a number of these and other cases.

**Gum Acacia in Secondary Traumatic Shock.**—Experiments were made by Gasser and Erlanger which had as their first object a detailed inquiry into the mechanism of why a concentrated solution of gum acacia tends to prevent the concentration of the blood which otherwise practically invariably develops while shock is being induced. When glucose in 18 per cent. solution is injected into the circulation of a normal animal the blood comes into osmotic equilibrium with the tissues within the first minute or two, the average maximum dilution amounts to but half of the theoretical maximum, and the blood regains its normal concentration within from five to forty-five minutes. When gum acacia in a concentrated solution is injected the average maximum dilution of 41.7 per cent. of the theoretical maximum is attained within from twenty-five to fifty minutes; the decline of the blood volume to normal requires from two and one half to six or more hours. When the concentrated acacia is immediately followed by the glucose the maximum dilution is quickly attained and is much greater than that resulting from the injection of either of the two substances alone. The dilution is well maintained. Comparable results are obtained in animals in shock when a strong solution of gum acacia is followed by a solution of sodium bicarbonate that is isosmotic to 18 per cent. glucose. With such a combination of solutions given in appropriate amounts, the blood volume, the blood pressure and the reserve alkali of animals in shock often can be brought to normal and held there for the usual duration of an experiment. Yet such animals, as well as shocked animals treated with other combinations of gum acacia and carbonate or bicarbonate, often died within twenty-four hours.

**Treatment of Traumatic Shock.**—Of animals traumatized by holding the arterial pressure down to 40 mm. Hg for two hours and fifteen minutes by partially occluding the inferior vena, 48 per cent. die within forty-eight hours. When treated with 6 per cent. gum in 2 per cent. sodium bicarbonate, 12 c.c. per kilogram of body weight, 45 per cent. die within forty-eight hours. When treated with 25 per cent. gum followed by 5 per cent. sodium bicarbonate, of each 5 c.c. per kilogram of body weight, 56 per cent. die within forty-eight hours. When treated with 25 per cent. gum followed by 18 per cent. glucose, of each 5 c.c. per kilogram of body weight, 45 per cent. die within forty-eight hours. When treated with 25 per cent. gum in 18 per cent. glucose, 5 c.c. per kilogram of body weight and hour, 24 per cent. die within forty-eight hours. Not only is the death rate increased by the third treatment, but death occurs earlier. These results are taken to indicate that bicarbonate and the high viscosity of a strong gum solution are somewhat harmful, at least, in traumatized animals; that the harmfulness of the strong, viscid gum can be avoided, in part, through the osmotic action of hypertonic glucose subsequently injected, but not by bicarbonate; and that when the hypertonic gum and the hypertonic glucose are given simultaneously and slowly so as to avoid altogether the period during which the high viscosity of the gum is hampering the circulation, a maximum saving of life can be effected. The beneficial results presumably are due to the internal transfusion effected by the hypertonic solutions, to the maintenance of the increased blood volume through the colloidal and possibly other properties of the gum acacia, to the action of the hypertonic solution on the heart and blood vessels, and to the specific action of glucose on nutrition in general and on that of the heart muscle in particular.

**Hypertonic Gum Glucose in Secondary Traumatic Shock.**—According to these observations made by Erlanger and Gasser the use of hypertonic gum glucose solution is not contraindicated in the treatment of shock even when it is complicated by dangerous hemorrhage. The fact that the hypertonic gum glucose solution does not prejudice the recovery of animals from the effect of a hemorrhage that is apt to result fatally furnishes another proof of the innocuousness of this solution.

**Effect of Oxygen on Blood Volume in Lung Edema.**—The continuous administration of oxygen to goats gassed with chlorpicrin did not inhibit the concentration of the blood. The percentage saturation of the hemoglobin with oxygen was normal even after a considerable concentration of the blood had occurred. The concentration of the blood is not caused by the imbibition of water by the tissues as the result of oxygen want. Wilson and Goldschmidt conclude, therefore, that the loss of water from the blood is due to the development of the edema of the lungs.

**Sympathetic Nervous Control of Thyroid Function.**—In one series of five rabbits given daily injections of about 10

mg. of cocain per kilogram body weight for eight days there was observed no change whatever in the microscopic appearance of the thyroid glands. A second series of three rabbits was run, each animal receiving from five to ten injections a day for eleven days, and again no changes in the glands were observed. Neither did the rate of growth or general appearance and behavior of the animals indicate any lasting results from the use of the drug. Since the strength or effectiveness of the impulses over the sympathetic fibers should have been greatly augmented by the continued use of cocain producing symptoms of thyroid hyperactivity and morphologic changes in the gland, Mills concludes that the evidence from these experiments contributes to the indication of a lack of secretory function of the sympathetic fibers to the thyroid gland.

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**Streptococcus Hemolyticus Carriers.**—Bacteriologic examination of a considerable number of excised tonsils has convinced Bryan of the futility of local treatment in attempting to eradicate *Streptococcus hemolyticus* from the tonsils. While it may be possible to sterilize the surface of the tonsil and some of the crypts there will nevertheless remain a number of these crypts that are inaccessible to any chemical means of disinfection. Granting that all the crypts were accessible, there still remains the possibility of still further disease in the deeper and more inaccessible parts of the gland. Therefore, all local treatment after the cultures show the presence of *S. hemolyticus* is not only deceptive but it is a waste of time. A complete enucleation of the tonsil is necessary. Any tonsillar tissue remaining after an incomplete operation harbors the organism and the patient continues to be a carrier.

**Bacteriology of Streptococcus Hemolyticus.**—In this paper are presented the facts obtained in a biologic study of *S. hemolyticus*. By the reaction of agglutination four distinct immunologic types and a certain number of unclassifiable strains have been discovered among the 125 strains studied by Avery and his associates, Dochez and Lancefield. Individuals of the same type are closely related to one another immunologically, and the different types can be distinguished sharply one from the other. In addition to the four types, study of the reactions of which has been completed, there are in addition two other types, investigation of which is as yet incomplete. The authors found that by the immunization of sheep, a highly specific agglutinating serum is obtained, but that the serum produced from rabbits is not so specific and may show a wider range of crossing. Rabbit serums showing nonspecific cross agglutination reactions, in general fail to manifest corresponding cross protection reactions. Whenever it has been possible to raise the animal virulence of strains of *S. hemolyticus*, the evidence obtained from the agglutination tests has been confirmed by that gained from the protection reaction. In all instances in which this has been done, the one reaction has corroborated the findings of the other. The performance of reliable protection tests has been made possible by the production of sufficiently high titer antistreptococcus serum, and by the possibility of raising the animal virulence of a certain number of strains to a high degree.

This work has cleared up a number of points about *S. hemolyticus* which have been in dispute for many years. In the first place, *S. hemolyticus* of human origin is not a unit type, as was previously supposed, but probably consists of a number of types, at least four of which have been identified. Previous investigators have stated that freshly isolated human strains change their antigenic properties on animal passage, and that the latter procedure for the development of animal virulence gives a common antigenic character to all strains. The authors have found no evidence to support this contention—in fact, immune serums produced with human strains that have never been passed through animals afford a high degree of protection against strains that have received many animal passages. In addition, the antigenic differences between strains of *S. hemolyticus* which have been passed through animals are quite as distinct as those between strains which have not been so passed The types of *S. hemolyticus* studied have been obtained almost exclusively from the respiratory tract and from a limited source of supply, and there is some reason to believe that those which produce cellulitis, erysipelas and septicemia may be of somewhat different character.

**Streptococcus Carriers in the Army.**—The available evidence presented by Blake would seem to indicate that the widespread streptococcus infections that have occurred in the army have, in very large part, been due to invasion of virulent streptococci in individuals rendered susceptible by predisposing diseases, chiefly measles, influenza and pneumococcus pneumonia through contact infection, either direct or indirect, and that autogenous infection has played an insignificant rôle in the production of these streptococcus infections. Their truly epidemic character and their strikingly selective incidence, Blake says, would seem to admit of no other interpretation.

**Nasal Sinus Disease in Infants.**—In all cases of infectious arthritis in infants and young children studied by Dean and Armstrong during the last eighteen months, the source of infection has been in the upper respiratory tract, in the nasal sinuses, or faucial or pharyngeal tonsils. In no case were the teeth, the gallbladder, appendix or the lingual tonsil the source of infection. The most common symptom has been sneezing. A condition characterized by listlessness, poor appetite, underweight, poor color, so commonly caused by diseased tonsils, which persists after the removal of the tonsils and adenoids, with negative report from the pediatrician so far as a systemic condition is concerned, is very suspicious of sinus disease. The diagnosis of sinus disease is very difficult. It is only by repeated examinations of the nose and careful study of the case from every angle, that a proper diagnosis can be made. The most important thing in the treatment of nasal sinus disease in infants and young

children is the removal of the adenoids and diseased tonsils, if present.

**Complete Extirpation of Larynx for Carcinoma.**—Hoshino has observed forty-one cases of laryngeal carcinoma, in sixteen of which a complete extirpation of the larynx was done, most often under local anesthesia. Hoshino describes the operation in detail. He says that better results are obtained when there are two flaps in the skin incision, each having its stalk in the side of the neck, than when there is only one large flap with one base. It is more successful to section the trachea below the larynx and arrange for safe respiration before removing the tumor. The pharyngeal wound is sutured with a double suture, but the mucous membrane is approximated in the submucous layer. Between the main laryngeal wound and the opening of the trachea should be a bridge of intact skin, as Grueck suggested. For the purpose of conversation after extirpation, a simple rubber tube is used by Hoshino, one end being introduced into the trachea while the other end is held in the mouth. This tube enables the patient to whisper with the help of his lips, teeth, tongue, palate and pharyngeal muscles. The tube is much easier to use than the modern complicated artificial larynx, and is better liked by the patient. The percentage of permanent cures in Hoshino's sixteen cases was 50, while there was also 50 per cent. recurrence, with no mortality during or following the operation.

**Conserving Mucoperiosteum in Maxilla Resection.**—In the case cited by Hoshino and Ota a tumor about the size of a hen's egg was situated on the left upper alveolar process. The tumor was chiseled away from the healthy bone, thus leaving only the mucoperiosteum for the floor and lateral wall of the nasal cavity. It was necessary to remove the anterior part of the alveolar process from the incisor tooth on the right side to the first molar tooth on the left side and also the anterior half of the hard palate. In addition, one third of the median wall of the antrum of Highmore was removed, but the mucosa of the sinus was not disturbed. The oral mucous membrane on the remaining portion of the hard palate, and that on the upper lip was loosened and then approximated to the edges of the wound. This left a small wound in the roof of the mouth which had to heal by a process of granulation from the surrounding edges of the mucosa, while the nasal cavity was covered entirely by the mucoperiosteum. The patient recovered in sixteen days without any complications. He is able to talk and to swallow food without any of it passing into the nares

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*Benzin Poisoning, Report of Chronic Case. R. L. Haden, Detroit.—p. 309.
*Reaction of Monkeys to Inoculation of Measles Blood. A. W. Sellards, U. S. Army.—p. 311.

**Studies on Blood Sugar.**—Experiments made by Hamman and Hirschman showed that in normal persons the administration of a second dose of glucose immediately after the reaction to the first dose produces a much less marked reaction on the blood sugar than did the first dose. These experiments indicate that the mechanism of carbohydrate utilization once stimulated works more efficiently than when called on abruptly to manage large amounts of glucose. Probably to this fact is largely due the better utilization of sugar slowly absorbed, and the almost unlimited power of the body to utilize starch. In diabetics the same difference is observed as in normal persons, although the difference is not so marked. It was found in testing several patients that they reacted to levulose in the same way that they did to glucose, only that the blood sugar rise was less marked.

**Chronic Benzin Poisoning.**—The symptoms complained of in a case of chronic benzin poisoning are referable almost entirely to the gastro-intestinal tract and the central nervous system. Haden describes them in detail as part of his case report. The factory at which the patient worked was visited. It was found that lithographing rolls were dropped into a trough, six feet long and one foot wide, filled with benzin, and scrubbed clean. About two gallons of benzin evaporated from the trough daily. The room in which the work was done was large, but from the nature of the lithographing inks it had to be closed tightly to prevent the ink from drying. The patient had worked for over a year, five hours daily, at this trough where he was continually inhaling the fumes.

**Reaction of Monkeys to Inoculation of Measles Blood.**—Blood from two early cases of measles in the pre-eruptive and later in the early eruptive stage was injected subcutaneously and intraperitoneally into two monkeys. One animal remained free from symptoms; the other developed a moderate leukopenia and later a slight rash. A portion of the same specimen of measles blood was injected subcutaneously and intramuscularly into two susceptible human volunteers. No symptoms resulted. A specimen of blood from the monkey which subsequently developed a rash was injected into a susceptible volunteer, but produced no symptoms. Normal serum injected into monkeys was followed by a very slight erythema appearing about eight to ten days after injection in four of ten animals. Sellards believes that the weight of evidence in these experiments is against the interpretation of the symptoms in this monkey as representing a reaction to the virus of measles.

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**The Syphilitic Prostitute.**—Goodman is in charge of the venereal service at Camp Las Casas, Porto Rico, and he here reports (in English) the results of clinical and serologic examinaton of 791 prostitutes in Porto Rico. His tables show that 139 of the 721 girls were under 17 years of age and 42 per cent. in this group had three or four plus Wassermann reactions; 15 per cent. had active infectious syphilitic manifestations. About 48 per cent. of the total were between 18 and 23 years of age; 50 per cent. of these gave a pronounced Wassermann reaction; 11 per cent. had active genital lesions of syphilis. Of the 147 women between 23 and 27 years of age, 45 per cent. were serologically positive, and 11 per cent. had dangerous syphilitic manifestations. Only sixty-four women were in the age group 28 to 32 years, and 43 per cent. of these had three or four plus Wassermann reactions but only 4 per cent. had active lesions. In the three five-year periods above this, from 33 to 37, 38 to 42 and 42 to 56, thirty-six, twelve and five women of a positive Wassermann reaction was obtained in 38, 33 and 25 per cent. respectively. The series of prostitutes studied included 422 whites, 304 mulattoes and 65 negresses, but the proportion of positive Wassermann reactions was about 47 per cent. in each group. In the ratio of active syphilitic lesions, however, the whites gave 10 per cent., the mulattoes 13 per cent. and the negresses only 3 per cent. with infectious syphilitic manifestations.

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Gastric Ulcer. W. N. Lynn, Knoxville.—p. 211.
Hemorrhoids, with Special Reference to Treatment. I. G. Duncan, Memphis.—p. 214.
Osteomyelitis Complicating Influenza. J. Witherspoon, Nashville.—p. 217.
Pitfalls in Determining Prophylactic or Curative Value of Bacterial Vaccines, with Special Reference to Influenza. G. W. McCoy, Washington, D. C.—p. 219.

# FOREIGN

Titles marked with an asterisk (*) are abstracted below. Single case reports and trials of new drugs are usually omitted.

## British Journal of Tuberculosis, London

October, 1919, **13**, No. 4

House as a Factor in Problem of Tuberculosis. W. Younger.—p. 155.
Tuberculosis and Housing in Rural Districts. . G. Savage.—p. 160.
Prevention and Arrest of Tuberculosis in Canada. G. D. Porter.—p. 163.
*Tuberculin "M." for Treatment of Tuberculosis. R. W. Allen.—p. 70.
Alpine Health Resorts for Tuberculous Subjects. B. Hudson.—p. 174.

**Tuberculin Therapy.**—Allen took several strains of living human tubercle bacilli, treated them carefully with various solvents for the fats and waxes, dried and weighed them and subjected them to the very slow action of dilute hydrogen peroxid until only a slight apparently insoluble residue was left. After careful neutralization this solution was diluted with physiologic sodium chlorid solution containing 0.3 per cent. tricresol until 1 c.c. contained 20 mg. of the original dry bacilli. By the addition to this of an equal bulk of tuberculin A. F. (albumose free) tuberculin "M" is constituted. It accordingly contains (1) any little exotoxin which the tubercle bacilli may form growing in a protein free medium; (2) any endotoxin liberated by the autolysis of dead bacilli; (3) the broken down protoplasm formed by this autolysis; (4) bacillary protoplasm and endotoxin in considerable amount after lysinization, oxidation and hydrolysis. It contains no products resulting from the action of the bacilli and protein nutrients, i. e., no nonspecific toxins which may give rise to considerable constitutional reactions, while the bulk of the specific toxins have been subjected to oxidation and hydrolysis as must naturally occur in the body prior to the elaboration of specific anti-endotoxins. This tuberculin is, therefore, practically "atoxic" or "detoxicated," and can, therefore, claim precedence as such to any Thomson's detoxicated vaccines. Thus far Allen has given several hundred doses varying from 0.0001 c.c. to 1.0 c.c. in chronic and subacute cases, and has never seen any constitutional or general reaction result from a dosage of less than 0.4 c.c. other than a very slight feeling of malaise coming on within twenty-four hours. In every case he has been able to find a dosage, usually varying between 0.0001 c.c. and 0.001 c.c., which excites that mild degree of "focal" reaction which Allen considers as a highly desirable evidence of immunizing response, i. e., slight exacerbation of the signs and symptoms usually occurring within eight to twenty-four hours and thereafter passng away rapidly; in every case there has been steady improvement in the clinical signs and symptoms; in each case of completed treatment Allen has so far apparently induced the total disappearance of the tubercle bacilli; in one case, wherein for various reasons a complete course of treatment has been thrice interrupted, the tubercle bacilli, after having disappeared, have reappeared in about three months' time, again to disappear as tuberculin treatment was resumed. In view of these conclusions Allen feels justified in claiming after an experience of various tuberculins extending over nearly fifteen years, that in tuberculin "M" he has succeeded in elaborating a tuberculin which (1) is perfectly safe to use, being practically devoid of unaltered toxins; (2) which undoubtedly possesses power of inciting the formation within the body of the various antibodies necessary for the destruction of the invaders; and (3) which has an antigenic value far superior to any other tuberculin so far produced. For these reasons it is peculiarly adapted for the treatment of dispensary cases and of all such as are not resident in any institution. A safe initial dosage for an adult with chronic or subacute tuberculosis is 0.0001 c.c. The administration as regards dosages and intervals must be conducted under the control of observations of the reactions thereby induced; that an ultimate dosage of from 0.4 to 1 c.c. can and should, as a rule, be attained.

## British Medical Journal, London

Oct. 18, 1919, **2**, No. 3068

What Did John Hunter do for Medicine? A. Keith.—p. 485.
Surgical Training: Reminiscences and Suggestions. H. J. Stiles.—p. 487.
*Traumatic Aneurysm of Common Carotid. R. Jamison.—p. 488.
*Traumatic Rupture of Subclavian Artery: Death Nine Days Later. D. C. L. Fitzwilliams.—p. 488.
Balance of Colloid and Crystalloid in Cholera, Shock and Allied Conditions. B. Moore.—p. 490.
*Treatment of Incipient Mental Disease. R. A. Jones.—p. 492.
Cure of Bilharziasis by Intravenous Injections of Antimony Tartrate. J. B. Christopherson.—p. 494.
Two Cases of Hypernephroma of Ovary. A. K. Gordon.—p. 495.
Ionic Medication in Cancer. M. Wardle.—p. 495.
Case of Fractured Skull with Hemorrhage. A. L. Gregg.—p. 496.
*Absence of Uterus, Fallopian Tubes, one Ovary and Vagina, with One Large Central Kidney. F. R. Parakh.—p. 496.

**Traumatic Aneurysm of Common Carotid.**—Jamison cites two cases. One was a case of gunshot wound of the neck causing an arteriovenous aneurysm of the left common carotid. The internal vein was enormously distended, having a diameter of 2 inches. There was a communication between it and the internal carotid just below its division. The vein was divided and tied. The common carotid was ligatured in two places and divided between them. The external and internal carotids were ligatured at their origin from the common trunk. The second case was one of gunshot wound of the neck causing a dissecting aneurysm of the left com-

mon carotid artery. The sac of the aneurysm was roughly fusiform, and extended from 1½ inches above the clavicle to somewhere about the level of the lower jaw. The sac was perilously thin, and appeared to consist only of some of the outer coat of the artery. The internal jugular and the common carotid were ligatured. During the process the sac burst spontaneously in its upper part. A swab was pressed on the hole and controlled the bleeding. The tying of the carotid was then finished. The sac entirely overlay the external and internal carotids, preventing any search for them, so two swabs were placed on the hole in the sac and pressure maintained on them by sewing the inner edge of the carotid sheath firmly to the edge of the fascia covering the sternocleitomastoid. This proceeding stopped the hemorrhage and the wound was closed. The wound was reopened five days later and the swabs removed. The sac had been obliterated entirely and no hemorrhage occurred. The wound was reclosed. Both patients were young men and made uninterrupted recoveries.

**Traumatic Rupture of Subclavian Artery.**—In this case the rupture of the artery was caused by the pole end of a boat hook which was pressed against the chest beneath the left clavicle. An operation was done at once. The proximal end of the artery was clamped. The distal end could not be found. The patient was very restless and would not keep his arm quiet. Further operative intervention was deferred until the patient's strength would permit it. He died on the ninth day from exhaustion. At the postmortem the subclavian artery was found completely severed, the distal end was full of firm clot. The vein was not torn. It is Fitzwilliams' opinion that this man's life might have been saved if he had been more reasonable and more amenable to treatment, in spite of the severe injuries he had sustained.

**Treatment of Incipient Mental Disease.**—Jones urges the establishment of psychiatric clinics because they would help to educate the public in matters of health, and certainly in respect of mental health. But besides their educational mission and their great therapeutic utility, they are urgently needed for the better education of medical practitioners and students and for research in psychiatry. Three universities in England have taken this matter into serious consideration.

**Absence of Uterus, etc., with One Large Central Kidney.**—Parakh's patient was 17 years of age. The vulva was perfectly formed, the pubis well covered with hair, and the breasts well developed. There was no vagina, except for about a quarter of an inch. On rectal examination a distinct tumor was felt a little above the closed end of the ill-formed vagina. This was believed to be the uterus, but neither tubes nor ovaries could be felt. On opening the abdomen it was found that the tumor felt from the rectum was a large central kidney, slightly horseshoe shaped, but placed low down. There was no ovary or tube on the right side, but a fairly large sized ovary was present on the left side, with a fallopian tube running down and disappearing into the upper end of the closed vagina. There were several small cysts in connection with the mesentery.

## China Medical Journal, Shanghai

September, 1919, **33**, No. 5

Investigations of Outbreak of Epidemic Meningitis in Hongkong. P. K. Olitsky.—p. 413.
Three Cases of Intestinal Obstruction. R. H. Mole.—p. 432.
*Simple Method for Producing Anaerobic Conditions for Bacteria Cultures. L. M. Miles.—p. 444.
Nervous Disorders of Sexual Origin. F. Oldt.—p. 446.
*Case of Cholelithotomy: Patient Operates on Himself. J. A. Snell.—p. 454.
Treatment of Malaria. R. V. Taylor, Jr.—p. 455.

**Anaerobic Conditions for Bacteria Cultures.**—The method described by Miles uses the hydrogen substitution process, and the apparatus consists of a flask fitted with a two hole stopper through one hole of which a thistle tube is inserted to the bottom of the flask, and through the other, a glass tube bent sharply in a short curve at the lower end, is inserted. Granulated zinc, or small squares of the metal, are placed in the flask. The other part of the apparatus is a beaker of about 500 c.c. capacity, half full of liquid petrolatum. Preliminary to use, the flask and beaker are placed in a hot air sterilizer and heated to 150 C. for one hour. The culture of organisms is sowed on a freshly slanted agar tube; the tube is flamed well on the outside and inverted over the short tube end in the beaker of liquid petrolatum. Hydrochloric acid is added to the flask containing the zinc through the thistle tube; it is well to add also some water, and a little copper sulphate to act as a catalyzer. Hydrogen is evolved and in a short time it completely replaces the air in the culture tube. The tube is left in the oil and as many tubes are sowed as are needed. The beaker containing the culture tubes is then incubated, the liquid petrolatum effectually sealing the tubes against the entrance of air. One great advantage this method has over others is that the tubes are readily accessible for examination; they remain anaerobic so long as the open end is not removed from the oily liquid, and can be handled in examination. Further, the volume of air to be displaced is small in each tube and this increases the efficiency of the air substitution. Usually a few minutes will suffice to replace the air with hydrogen.

**Cholelithotomy Performed by Patient.**—Snell reports the case of a Chinese doctor who following an attack of dysentery had a very severe attack of pain in the upper right abdomen. This pain sometimes improved and then became worse. He had not noticed any jaundice or fever. About six months later a swelling appeared over the site of this pain. It was very tender and the patient had fever. The swelling took on the form of an abscess and the patient opened it himself with a knife. Some pus came away and later there was a watery, yellowish discharge which continued for several months. The wound did not heal. Four months later he noticed something dark and stonelike in the wound. On pressure out came two faceted stones. Twenty days later, four more were passed. The gallbladder was removed.

## Journal of Tropical Medicine and Hygiene, London

Oct. 15, 1919, **22**, No. 20

Insanitary Snails at Durban During Winter Months. F. G. Cawston.—p. 89.
Diplocercomonas Soudanensis. A. J. Chalmers and W. Pekkola.—p. 190.
*Quinin Metrorrhagia. A. J. Chalmers and R. G. Archibald.—p. 191.

**Quinin Metrorrhagia.**—In the case cited by Chalmers and Archibald hemorrhage was due to quinin dihydrochlorid which the patient had been taking for several months as a prophylactic measure against malaria. The quinin was stopped and after a short interval the girl was placed on calcium lactate, 10 grains, twice daily. The metrorrhagia which had been going on for several months quickly ceased. There was, however, a slight recurrence with the next menstrual period, but this was quickly controlled by a few doses of the same mixture. The authors suggest that this line of treatment might be useful for controlling the menorrhagia of the tropics when excessive.

## Lancet, London

Oct. 18, 1919, **2**, No. 5016

Third Eyelid. J. Bland-Sutton.—p. 673.
*Serologic Differences Between Blood of Different Races. L. and H. Hirschfeld.—p. 675.
*Two Studies of Meningococcus Carriers. D. Embleton, W. S. Bryant and G. H. Steven.—p. 679.
*Instability of Red Blood Cells Preserved by Method of Rous and Turner. G. Dreyer and A. D. Gardner.—p. 687.
Prognostic Importance of Tuberculosis of Larynx. S. Thomson.—p. 689.
*Ancylostoma Duodenale, with Pyloric Obstruction. H. K. V. Soltau.—p. 690.

**Serologic Racial Differences.**—The Hirschfelds point out that the highly interesting problem of a possible double origin of the human race has become a question which can be studied by means of serologic methods, and that experiments in immunization deserve to be made use of for the solving of anthropologic questions. A close cooperation would be necessary between anthropologists and serologists, and the researches should be conducted on an international basis. A series of important special researches, such as the examination of various stocks, primitive races, and anthropoid apes, should be begun without delay.

**Meningococcus Carriers.**—According to Embleton and his co-workers, the sites of carrying in the chronic meningococcus carrier are Luschka's tonsil, the fossa of Rosenmüller, the retronasopharyngeal wall, and the faucial tonsils. The anterior and upper parts of the nose and the nasal sinuses are not, as a rule, infected. The presence of lymphoid hypertrophy and nasal obstruction, although it may favor the production of a "chronic carrier," is not necessarily the cause. Meningococcus carriers are devided into two groups: (1) Acute or temporary carriers, those carrying under eight weeks; (2) chronic carriers, those carrying over eight weeks. Acute or temporary carriers remain infectious on an average for twenty-four days; the maximum discharge rate occurs during the third week. Chronic carriers remain infectious on an average for five and a half months, the longest carrying period found was 634 days, or one year and nine months. Eighty per cent. of carriers are acute or temporary, 20 per cent. chronic. The type of coccus carried rarely changes; in 905 carriers this was only observed to occur once. Treatment of the carrier appears to prolong the carrying period. The meningococcus remains in the "carrying site" until ousted by some other bacterium. A large number of nonagglutinable organisms, otherwise indistinguishable from the meningococcus, are probably altered meningococci. The best method of freeing a meningococcus carrier from infection is Nature, open air and exercise.

**Instability of Red Blood Cells.**—Dreyer and Gardner are convinced that it is not possible to obtain a standard suspension of red cells of constant sensitiveness to hemolysins by means of Rous and Turner's method. Therefore, the use of such suspensions as a standard unchanging material for experimental work or for routine complement fixation tests would necessarily lead to erroneous results.

**Ancylostoma Duodenale Causing Pyloric Obstruction.**—In the case recorded by Soltau pyloric obstruction was the obvious cause of the vomiting and a movable mass to the right of the median line suggested a new growth. A new feature was, however, presented when the patient passed large masses of the ova of *Ancylostoma duodenale*. Though the evacuation was not accompanied by any change in the tumor, the question arose whether there might not be ulceration caused by the ankylostoma with surrounding induration. Clinically, the mass resembled a pyloric cancer in outline, mobility, and situation, but might equally well be due to induration around an ulcer. The abdomen was opened. There was no free fluid in the general peritoneal cavity. Extending from the duodenopyloric junction toward the midline and involving the lesser curvature for about 2½ inches was a large mass firmly adherent to the liver, gallbladder and pancreas. On the surface, and extending on to the anterior surface of the stomach, were many small, white, irregularly shaped patches resembling in appearance an aphthous stomatitis. These patches were not raised or hard. No enlarged glands were felt in the mesentery, but the glands in the lesser gastrohepatic omentum were palpable. In order to relieve this obstruction a posterior gastroenterostomy was performed. The result was most encouraging. The patient improved steadily. The following points are of interest: The onset with dysenteric symptoms and improvement under emetin; the hematemesis two month later, which lasted for three days only and never recurred; the presence of a tumor; probably a direct result of the invasion of the pyloric wall by the hookworm causing obstruction; the distribution and character of the tumor; the amount of thymol which had to be given before a final negative result was obtained—two doses of 30 grains each are sufficient in nearly 90 per cent. of all cases; the similarity between the blood count and that of pernicious anemia; the diminution of reds and the high color index, and marked improvement of the anemia as the result of the relief of the obstruction; the complete absence of eosinophilia.

## Medical Journal of Australia, Sydney

Sept. 13, 1919, **2**, No. 11

*Influence of Treatment and Rest on Gonorrhea. W. L. Potter.—p. 211.
Three Cases of Ophthalmoplegia. R. Pulleine.—p. 217.

**Influence of Treatment and Rest on Gonorrhea.**—Potter is convinced that in the treatment of gonorrhea want of rest and improper treatment, such as early urethrovesical irrigation, will cause epididymitis to develop. Diet and medicine, he says, are of secondary importance. Prostatic massage and vaccine are not useful.

Sept. 20 1919, **2**, No. 12

*Treatment of Retroflexio Uteri. W. Ritchie.—p. 233.
*Treatment of Salpingitis. J. C. Windeyer.—p. 235.
After Effects of Gunshot Wounds of Head; their Treatment. H. S. Stacy.—p. 237.
Probably Radical Cure of Mixed Psoriasis of Fourteen Years' Standing. A. Krakowsky.—p. 239.

**Treatment of Retroflexed Uterus.**—The operation of internal shortening of the round ligaments, such as the original Gilliam operation, or one of its modifications, is preferred by Ritchie for the treatment of retroflexed uterus. However, he says he does not deal with every case of simple retroversion or retroflexion by operation, but only with those which give rise to pathologic symptoms. Many uteri are retroverted or flexed to various degrees and give rise to no trouble. These should be left alone.

**Treatment of Salpingitis.**—Windeyer is convinced that many women will be spared from mutilating operations, especially as regards the ovaries, and a not inconsiderable proportion will be given the chance of becoming the mother of one or more children, if when dealing with patients with first attacks, we should wait for a longer period before considering operation and make more use of vaginal celiotomy in the acute "pus cases."

Sept. 27, 1919, **2**, No. 13

Cause and Prevention of Dental Caries. G. E. Clemons.—p. 257.
Fracture of Lower End of Humerus. A. J. Wood.—p. 258.
*Interesting Problem in Forensic Medicine. W. A. T. Lind.—p. 261.
Pneumococcal Ulceration of Pharynx. B. Foster.—p. 262.
Carcinoma of Ascending and Transverse Colon. J. Corbin.—p. 263.

Oct. 4, 1919, **2**, No. 14

War Neuroses and Civil Practice. J. W. Springthorpe.—p. 279.
Superacute Pulmonary Edema. A. R. Southwood.—p. 284.
Case of Symmetrical Dry Gangrene. E. J. Addison.—p. 285.

**Traumatic Ulceration of Bowel: Problem in Forensic Medicine.**—Ulceration of the ileum with other bodily injuries was found in each of three postmortem examinations made on persons dying insane. According to Lind the injuries in all three cases must have been produced by violence applied to the chest and abdomen, presumably by some one kneeling on the supine victims. On opening the abdominal cavity, in the first case there was found a general peritonitis in early stage, due to the rupture of an ulcer in the ileum, not far from the cecum. The ulcer was recent, solitary, round, about 5 millimeters in diameter and not associated with disease of the intestines. Diligent search for foreign bodies or hatpin stab in the abdominal wall was made with negative result. There was also no bruising of the surrounding parts. In the second case the ulcer was slightly larger than in the first case, otherwise it was similar. In the third case there was an ulcer about the size of a 3-penny piece, with a clean surface, not perforated, apparently ready to commence repair. In the absence of other disease, such as typhoid, tubercle, foreign body, or any other possible factor in ulcer formation. Lind claims that it may reasonably be said that the ulceration is the result of trauma.

## Tubercle, London

October, 1919, **1**, No. 1

*Endopleural Operations in Pulmonary Tuberculosis: Jacobaeus' Method. W. Holmboe.—p. 1.
*Necessity for a Uniform Standard of Classification in Pulmonary Tuberculosis. J. Guy.—p. 9.
Case of Innocent Tuberculosis. S. Thomson.—p. 13.

**Endopleural Operations in Pulmonary Tuberculosis.**—In Jackobaeus' method a thoracoscope is introduced into the pleural cavity. By means of the galvanocautery pleural adhesions are divided, the hand being guided by the eye. The purpose of these measures is to make it possible to collapse the lung. Holmboe calls attention to the dangers of Jacobaeus' method, such as hemorrhage, emphysema under the skin, elevation of temperature, pleural effusion and fistulas. He has employed the thoracoscope in twenty-seven

cases; among these there were nine in which cauterization appeared to be indicated. In five of these striking improvement was effected, and in two others there was some improvement.

**Necessity for a Uniform Standard of Classification in Pulmonary Tuberculosis.**—The classification used for official purposes in the public health service in Edinburgh is practically similar to that adopted by the sanatorium workers of North America. The basis is the Turban-Gerhardt classification and the time honored stages of 1, 2 and 3 are kept. In addition some indication has to be given of the general condition of the patient, and here Guy has adopted the threefold division of (*a*) good, (*b*) moderate and (*c*) bad. When cases are met with in which the lesion is quiescent, i. e., producing no disturbance, local or constitutional, or in which it has been quiescent long enough to apply the term healed to it, the anatomic classification is given and the word quiescent or healed is added, as stage 1, healed, or stage 2, quiescent. Grave difficulties are encountered when an attempt is made to define borderland cases before they are quite definite enough for stage 1a, or where they do not conform to all the requirements of that class. In order to complete the classification a further addition is required. All cases with a definite syndrome, all cases of hemoptysis, all cases of marasmic babies with a positive skin reaction, Guy says should be classified as stage A, thereby indicating that no local lesion was detected but that the diagnosis depended on constitutional symptoms and history alone. All cases in which the syndrome was incomplete, or where other factors, such as bad home hygiene, came in to confuse the diagnosis, might be classified as stage A suspect, or simply as suspect.

## Bulletin de l'Académie de Médecine, Paris

Oct. 7, 1919, **82**, No. 30

*Heliotherapy after Pleurisy. P. F. Armand-Delille.—p. 156.
*Surgery of the Heart. H. Vaquez.—p. 157.
*Alcohol in Cerebrospinal Fluid. E. Lenoble and F. Daniel.—p. 160.
*Disease of the Nails. A. Sartory.—p. 162.
Influenza in Strasbourg. Eugene Folly.—p. 163.
*Dispensary for Workers on Munitions. Paul Blum.—p. 165.
Industrial Capacity of the War Crippled. Gourdon and Dijonneau.—p. 167.

**Preventive Heliotherapy After Serofibrinous Pleurisy.**—Armand-Delille emphasizes that in his experience nothing has proved so effectual as heliotherapy in warding off pulmonary tuberculosis after a spontaneously curable attack of tuberculosis of the serous membranes. This, he reiterates, is the more important because heliotherapy does harm rather than good when pulmonary tuberculosis is once installed. He has applied full sun baths in the treatment of convalescents from pleurisy, both adults and children. The results have been absolutely satisfactory, none having developed tuberculosis in the lungs or elsewhere, and the intervals since have been up to six and seven years. He applies the heliotherapy in the form of extensive sun baths, given progressively under attentive medical surveillance, and advises to keep up this treatment for several years, continuously or intermittently, a complete course at first, and then a supplementary course for a few months each year in favorable conditions in a southern or mountain climate or in the home city during a sunny summer. If the persons who have had serofibrinous pleurisy will do this they can lead otherwise an almost normal life, and, he asserts, need not fear the ulterior development of pulmonary tuberculosis.

**Surgery of the Heart.**—Vaquez reviews the new possibilities in surgery of the heart which recent research and the war experiences have opened up. Tuffier has specified the zones in the heart which it is extrahazardous to touch, and those which will bear handling. If physicians will determine the mechanism of valvular lesions, their pathologic physiology, and will point out those cases which might be remedied by an operation, surgeons could then study out the best means to accomplish this. Valvular insufficiency does not belong in this class as it is the result more of retraction of the columns than of loss of substance. Stenosis of the various valves offers a more promising field, as when aortic stenosis, for example, is inducing a considerable hypertrophy of the left heart, or mitral stenosis is causing great dilatation of the auricle. The prognosis then is extremely grave whatever the other symptoms may be. In a case of the kind some years ago the mitral stenosis in the young man had caused such high pressure in the lesser circulation that the second pulmonary sound at the base was so loud that it could be heard at a distance. Vaquez discussed with Tuffier the possibility of operative relief, but they did not dare to assume the risk, and the young man died in a few months with multiple infarcts in the lungs. He queries whether resection of the semilunar valves might not be possible and useful in such a case, assuming that the stenosis is not due to changes in the vessel itself. With mitral stenosis, some other intervention would have to be devised to meet the indications, and several methods can be imagined which might prove effectual, but Vaquez does not specify what those methods might be. The physician must indicate his preferences and it is for the surgeon to realize them. An encouraging element is the notable progress realized in operations on the heart in these years of warfare. Data have been accumulated which should be analyzed from the standpoint of the greater or less tolerance of different points in the heart. Study of such data, supplemented by the findings of persevering research on animals, opens a prospect of interventions on the heart for lesions of a medical type. When that day comes, the surgeon, blamed today for having too much confidence in them, will be censured for having refused the surgical resources at his command to a patient otherwise irremediably doomed.

**Alcohol in the Cerebrospinal Fluid.**—Lenoble found with the Nicloux test applied repeatedly to eight men that the alcohol content of the blood after ingestion of alcohol varied within a wide range, but that the alcohol content of the cerebrospinal fluid kept at a constant figure. This figure was 0.02 per thousand after ingestion of 325 c.c.; 3 per thousand after 350 c.c.; 4 after 400 c.c. and 6 per thousand after 450 c.c. The proportion of alcohol in the urine is larger but the elimination here is more rapid. In the cerebrospinal fluid an average of ten days is required for its elimination or even longer, up to eighteen days, or more, with much alcohol; eight days seems to be the minimum. Acetone has to be excluded, as this gives a similar response to the Nicloux test. An assassin claiming to have been intoxicated at the time of the crime can have his statements substantiated or refuted in this way. It has also cleared up the diagnosis in certain obscure morbid conditions, including coma from alcohol intoxication superposed on uremia, epileptic crises, intracranial hemorrhage, etc.

**Diseases of the Nails.**—Sartory examined twenty-one cases of hypertrophy of the nails and a large number of cases of mycoses of the nails, and found that some fungus growth was responsible for the abnormal conditions in every instance. With the trichophyton the nail grows thinner, but with the other fungi involved the nail grows thicker. The cases labeled onychogryphosis all belong therefore in the onychomycosis category.

**Dispensary for Munition Workers.**—Blum describes the work of a dispensary organized for the women workers on munitions. It was open for two hours every evening, and over 900 applicants were recorded each month. It has now 2,000 made-out cards, and has done a most important work in prophylaxis and treatment, especially in pathologic gynecologic conditions, in tuberculosis and pretuberculosis, in anemia, and in venereal diseases. Blum urges the necessity for maintaining this dispensary for women factory workers and founding others, as the women apply to it with greater confidence and in larger number proportionately than to the specialized tuberculosis or venereal disease dispensaries.

## Bulletin Médical, Paris

Sept. 27, 1919, **33**, No. 41

*The Bordet-Wassermann Reaction. Jeanselme and M. Bloch.—p. 533.
*Responsibility of Physician when Wetnurse is Infected by Syphilitic Nursling. G. Thibierge.—p. 537.
*Abortion of Syphilis: Lacapère and Laurent.—p. 539.
Inherited Syphilis of Endocrine System. R. Barthélemy.—p. 541.
*Syphilis and Immunity. Clément Simon.—p. 544.

**Interpretation of Wassermann Reaction.**—This entire number of the *Bulletin* is devoted to syphilis. Jeanselme and Bloch reiterate that the physicochemical modification of the serum in syphilitics which yields the Wassermann reaction is nothing specific, and differs completely from the so-called immunity reactions. It is mere chance, they say, that in our climate this modification occurs only in syphilis. The reaction can be induced in normal persons by intravenous injections of neo-arsphenamin, and this may happen also and more readily in syphilitics giving previously a negative reaction. The principle they advocate is that every patient with recent syphilis should be given arsphenamin treatment until the blood gives no Wassermann reaction. Then mercury can be given, but any return of the Wassermann reaction, even without manifest symptoms, calls for renewed vigorous treatment and continuation of the arsenic.

**Responsibility of Physician When Wetnurse Acquires Syphilis from Nursling.**—Thibierge cities some recent damage suits brought against physicians on these grounds, and he remarks that such suits will probably become more and more frequent in the near future. If the wetnurse was syphilitic at the time she was given the infant to nurse, or developed syphilis within the incubation period the physician is relieved of all responsibility. If he overlooked or misinterpreted syphilitic lesions on the child, the courts do not hold him responsible unless there is evidence of crass ignorance or carelessness. But if the physician recognized the syphilis, as evidenced by the prescriptions or directions he gave, and failed to warn the wetnurse, then he is assessed damages. In one case cited the sum was 8,000 francs and costs, and in the case of the infant of a medical student, 6,000 francs ($1,200). If the wetnurse has herself consulted the physician, or if his oversight of the child is part of his public duties, he can be explicit in warning the wetnurse not to allow herself or the environment to become contaminated by the infant's secretions or soiled articles. If he is the physician of the child or the family, then he owes professional secrecy to them, and he must not tell the nurse that the child is syphilitic. Some damage suits have been brought against physicians, midwives and institutions because they handed over a foundling to a nurse without examining it for syphilis. Thibierge reiterates that the child of a syphilitic should never be given to a healthy wetnurse nor the child of a person seriously suspected of syphilis. Take from the healthy wetnurse at once every child with manifestations of or suspicions of syphilis, and in the latter case seek in every way to make the diagnosis sure as speedily as possible.

**Abortion of Syphilis.**—Lacapère and Laurent report a number of cases in which infants or adults had been exposed to syphilis, but vigorous arsenical treatment during the incubation phase seemed to eradicate the virus. They do not believe in starting vigorous treatment from mere syphilophobia, but watch intently for some specific manifestation. At the first sign of this, there is still time to effectually abort the disease.

**Syphilis and Immunity.**—Simon says that we cannot speak of an actual immunity in syphilis. The organism during the syphilitic infection is in a state of allergy. There is a tendency to an incomplete immunity and also a tendency to sensitization, and the different phases of syphilis correspond to the periods during which one or the other of these gets the upper hand.

## Bulletins de la Société Médicale des Hôpitaux, Paris

July 25, 1919, **43**, No. 26

*Urinary Infection of Intestinal Origin. A. Coyon and A. Lemierre.—p. 743.
*Adiposo-Genital Syndrome. P. Lereboullet and J. Hutinel.—p. 745.
*Pancreatic Treatment in Gastric Cancer. Maurice Loeper.—p. 754.
*Scoliosis with Sciatica. André Léri.—p. 758.
*Premature Ossification of Cranial Sutures. Marie and Léri.—p. 762.
*Renal Lesions in Acute Nephritis. P. Ameuille.—p. 764.
Crystalline Digitalin by the Vein. Noel Fiessinger.—p. 767.
*Tuberculous and Lethargic Encephalitis. G. Loygue.—p. 769.
*Jaundice from Retention. G. Loygue and H. Vinon.—p. 775.
Nephritis and Azotemia in Old Syphilitic. Marcel Pinard.—p. 779.
Pathogenesis of Influenza and Tuberculosis. E. Pruvost.—p. 783.
Diagnosis of Insufficiency of the Pancreas. M. Labbé.—p. 784.
*Purpura from Arsenic Poisoning. M. Labbé and S. Langlois.—p. 786.
*Splenectomy in Chronic Jaundice. A. Gilbert and others.—p. 789.

**Infections of Urinary Apparatus Originating in the Intestines.**—Coyon and Lemierre remark that in most of the cases of descending infection of the urinary apparatus, bacilli of the colon type are responsible. They published three years ago two cases of paratyphoid B pyelocystitis, and two of colon bacillus pyelocystitis. The clinical picture seemed to be identical in all. There was evidently septicemia of intestinal origin, with descending infection of the kidney pelvis and bladder. Septicemia probably occurs more frequently than is generally suspected after appendicitis and enteritis. Pregnancy pyelonephritis is generally preceded by gastro-intestinal disturbance, followed by symptoms of general infection. Kowitz published in 1914 a compilation of cases of pyelocystitis in young children developing in the course of gastro-enteritis. He related that the colon bacilli and albumin in the urine always preceded the appearance of leukocytes in the urine. A more recent report mentions the finding of the colon bacillus in the blood of one among eight children with chronic diarrhea, and a paracolon bacillus in another.

**Adiposogenital Syndrome.**—A case in a man of 33 and one in a woman of 40 are described, with the pathologic findings in the pituitary. The skin shows certain features suggesting that the thyroid may be at fault also. Both improved under pituitary treatment, the woman being given polyvalent glandular treatment. The infantilism in the man might be called reversive. Similar reversive changes in the genitals were reported by Frank and Marañón (1917) following bullet wounds of the pituitary. Several cases have been encountered at the Laennec Hospital within a year in which the patient's aspect suggested thyroid disturbance, but the loss of vision and manifest lesions in the sella turcica pointed to the pituitary as the primary gland at fault. Syphilis or tuberculosis may be responsible for this, and offer a chance for improvement under specific treatment. In the two cases reported here, inherited syphilis may possibly be incriminated. Along with the specific treatment, opotherapy may prove useful. The combination of pituitary and thyroid treatment has been particularly beneficial, the first patient having lost under it 5 kg. and the various subjective symptoms showing marked improvement. The pituitary treatment was given by the subcutaneous route

**Pancreas Extract Treatment in Gastric Cancer.**—Summarized when published elsewhere; see page 1560.

**Scoliosis with Sciatica.**—Léri describes two cases of sciatica in young men who were unable to hold their spine straight. There was scoliosis first to one side and then to the other. One of the men could change it from side to side by hoisting himself with his hands, lifting up the trunk. There seemed to be an abrupt, springlike action as the spine changed over, and this was slightly painful. Radioscopy also confirmed the assumption that some rheumatismal deformity of vertebrae was responsible for the scoliosis in these cases. This probably occurs also in other cases of what is called sciatic scoliosis.

**Steeple Skull and Syringomyelia.**—Marie and Léri cite some cases in which syringomyelia or hydromyelia developed in consequence of abnormally high pressure in the brain from tumor. They describe a case in their own service in which symptoms of syringomyelia accompany abnormally high pressure in the brain, but the pressure in this case is from premature ossification of the sutures of the skull, causing pronounced steeple skull.

**The Kidneys at Onset of Acute Nephritis.**—Ameuille has been impressed by the difference between the soundness of the kidneys of patients dying early in acute nephritis and the extremely pathologic condition with old chronic nephritis. In the latter, the kidneys are practically all destroyed, but in the early acute cases the kidneys seem practically normal, and yet there is equal and intense retention of nitrogen and chlorids in both. He suggests that the pathologic changes in the kidneys may be the result of the wearing out of the kidneys from an excess of work when the kidneys were really sound at the beginning of the trouble.

**Lethargic Encephalitis.**—The clinical picture in the man of 27 resembled that described recently as lethargic encepha-

litis, but in reality it was a tuberculous meningo-encephalitis. The symptoms were explained by the localization of the infectious process.

**Cancer of the Sigmoid Flexure.**—Necropsy cleared up a puzzling case in which a man of 27 suddenly developed jaundice from retention, and this proved to be the result of compression from a tumor which was a metastasis from a large silent cancer in the sigmoid flexure region. The latter had given no signs of its presence except intestinal hemorrhage on two occasions. The diagnosis had been catarrhal jaundice.

**Hemorrhagic Purpura from Therapeutic Arsenic Poisoning.**—Labbé and Langlois report the outcome of one of the three cases recently published by Leredde in which hemorrhagic purpura developed under neo-arsphenamin (neo-arsenobenzol) treatment. One case was mild, one subacute and fatal, and the last one was acute and the young woman died the tenth day of the purpura. Her blood showed the characteristics of both purpura and hemophilia; the anemia from the hemorrhages had been reenforced evidently by a hemolytic process. The liver was hypertrophied. The chancre of the lip and swelling of glands in the neck, with roseola a month later, were treated with six injections of the neo-arsphenamin during one month; then an interval of a month during which influenza developed; then four injections, each inducing congestion of the face; then a rest of three weeks and one injection; a rest of two weeks, and then four injections at intervals of a week or two, each of which was followed in two hours by bleeding from the gums and nose. After the last injection this bleeding kept up for a week, and a few ecchymoses appeared on the legs and a patch of purpura on the shoulder. One more injection was then given, and the bleeding from the gums, tongue and nose reappeared after an interval, and symptoms developed resembling those of infectious purpura with high fever and death the tenth day. Fifteen injections of the drug had been made in the course of five months, the doses ranging from 15 to 90 cg., a total of about 8 gm. Bleeding from the gums and nose and patches of purpura during treatment with neo-arsphenamin should warn to stop the arsenic treatment once and for all. In the discussion that followed, Grenet remarked that he had often noted small hemorrhages from the gums, or hemoptysis with previously latent tuberculosis, but he had never had any serious hemorrhages under this treatment. He had been impressed, however, with the frequency of jaundice developing during the two or three weeks after the neo-arsphenamin administration. Garnier confirmed this, but in his experience there was usually an interval of three or four months before the apyretic jaundice developed. In all the cases the jaundice cleared up soon and the cure was complete.

**Splenectomy for Chronic Jaundice.**—In Gilbert's case the jaundice appeared at the age of 2, and at 16 the spleen was found much enlarged. Since then the jaundice has developed in waves, most intense during the colder weather. At 33 the disease had reduced the erythrocytes to 1,900,000, and the cholemia varied from 1:1,500 to 1:3,000. The spleen measured 22 cm. but the liver was not enlarged and there was no pruritus or bradycardia, but the blood was veering to the type of pernicious anemia. The spleen was then removed, and the jaundice disappeared and the blood picture returned to approximately normal in two months. In this and in another case the splenectomy restored the patients to clinical health.

## Lyon Médical

September, 1919, **128**, No. 9

*Gangrene of Leg from Embolism. Gallavardin and Contamin.—p. 423.
Influenza and Tuberculosis. C. Roubier.—p. 428. To be cont'd.
*Tuberculosis with Albuminuria. G. Tolot.—p. 438.

**Insidious Onset of Gangrene from Embolus.**—Gallavardin and Contamin relate that a woman of 54 had formication and tingling in the left leg; then there were a few cramps and the leg felt heavy. By the end of the third week the symptoms had become more pronounced, and in another week the pains were intense. Ascending arterial thrombosis was demonstrated in the triangle of Scarpa at the amputation, and at necropsy six weeks later. In this and in two similar cases an embolus had evidently started the thrombosis. These experiences warn against delay in amputating in such cases, or the ascending thrombosis will extend too far for recuperation to be possible.

**Treatment of Tuberculosis with Albuminuria.**—In Tolot's case he disregarded the high albumin content of the urine, and gave every day the juice expressed from 150 gm. of beef or horse meat, as he considered that this was required for the pulmonary tuberculosis of the Landouzy typhobacillosis type, with recurring hemoptysis and asthma. As the general health improved under this, the albumin dropped from 1.10 gm. per liter to 0.60, to 0.10 and finally disappeared from the urine. Diphtheria antitoxin has been known to have a similar effect. High albuminuria in such cases calls directly for causal treatment, regardless of the albumin content of the urine which some might think contraindicates the antitoxin or meat juice.

## Paris Médical

Oct. 4, 1919, **9**, No. 40

*Progress in Neurology. J. Camus.—p. 253.
*Criminal Responsibility. Laignel-Lavastine.—p. 263.
*Latent Meningitis in Syphilitics. A. Sézary.—p. 268.
*Location of Spinal Cord Lesions. André Thomas.—p. 272.
Incapacity from Ulnar Paralysis. J. Lévy-Valensi.—p. 277.

**Recent Progress in Neurology.**—Camus' review covers the last five years, and he comments on the great progress realized during the war, and the complete revision it has brought in our knowledge of section of the spinal cord.

**Criminal Responsibility.**—Laignel-Lavastine begins his study of this subject by repudiating the term "criminal responsibility" and using instead "penal capacity," analogous to the expressions earning capacity and civil capacity. He discusses this from various standpoints, reiterating in conclusion that the medicolegal expert does not have to pass judgment on the penal capacity. All he has to certify to is *l'anormalité, la nocivité, l'impulsivité, l'intimidabilité et la perfectibilité* of the accused. It is for the court to decide from these premises whether the penal capacity is normal, attenuated, or nil.

**Latent Meningitis in Syphilitics.**—Sézary has modified his previously published views on this subject as new facts learned have compelled their revision. He now explains the meningitis revealed by lumbar puncture in syphilitics as testifying to nervous lesions, but he emphasizes that it is not a factor in their production. It is merely the ordinary reaction of any serosa to the presence nearby of some nest of spirochetes and the consequent local degeneration of tissues.

**Abdominal Wall Sign of Location of Lesion Causing Spinal Paraplegia.**—Thomas noted at necropsy of men with complete spinal paraplegia that the injury of the spinal cord extended much higher than had been surmised from the symptoms. Study of the volitional control of contracture of the muscles in the different segments of the abdominal wall and of the defensive reflexes in the same muscles has shown that these are modified in case of spinal cord lesions, as also the response to electric and mechanical stimuli, and that the limits of these segmental modifications correspond to the limits and gravity of the spinal cord lesion.

## Revue de Chirurgie, Paris

March-April, 1919, **38**, No. 3-4

*War Wound of Thoracic Aorta. L. Bérard and C. Dunet.—p. 177.
*Cancer of the Mouth and Pharynx. H. Aboulker.—p. 185.
*Inguinal Hernia. F. Burian.—p. 222.
*Treatment of Loose Shoulder. Dionis-Du-Séjour.—p. 229.
*Repair of Spongiosa. De Gaulejac and Nathan.—p. 250.
*The Fertile Element in Repair of Bone. De Gaulejac and Nathan.—p. 264.
Fracture of Tibia. R. Olivier.—p. 273.
*Bridge Artificial Anus. E. Malespine.—p. 277.

**Gunshot Wound of Aorta.**—The war has demonstrated that certain trunk arteries may be wounded without entailing

the internal hemorrhage that was to be expected. In a case described here, the bullet had passed entirely through the thoracic aorta from side to side, lodging finally in an intercostal space. The artery evidently contracted in a defensive spasm, and no blood escaped from it. The spasm relaxed at the seventeenth hour, and the blood then poured out and proved speedily fatal. The length of time the artery keeps up this defensive spasm in such cases is a guide to intervention in others.

**Cancer of Mouth and Throat.**—Aboulker reviews the outcome in 28 operations for buccopharyngeal malignant disease, and expatiates on the advantages of local anesthesia in such cases. He applied it exclusively in his last series of 10 cases which were all among the most extensive operations that can be done on the face and neck. Local anesthesia, he reaffirms, amply suffices for pharyngectomy and is indispensable. Postoperative bronchopulmonary disturbances have not occurred under local anesthesia in his experience, so that he is inclined to attribute these complications to the inhaled anesthetic irritating the air passages and, by its noxious action on the liver, reducing the general defensive reactions. Observation of a single case under local anesthesia is the most convincing argument to prove its superiority. There is no spectacle more astounding, he remarks, than to see the patient after the vast mutilation of a pharyngectomy get up himself from the table and start unaided to return to his bed after the two hour or two hour and a half operation. The last 4 in this group did not even lie down for an hour during the rest of the day. Four of them required a second operation, excision of glands in the neck, and none asked for general anesthesia. The patients have to be trained beforehand to allow the operation without full unconsciousness, and the surgeon has to train himself to work slowly, anesthetizing the successive planes in turn and waiting a minute or two for the anesthesia, and not working beyond the line of the injection. Demarcation of this is aided by adding a little blue stain to the anesthetic solution. He advocates section of the jaw or pharyngotomy; no tracheotomy for the anesthesia, it is necessary only to arrest sheet hemorrhage; no preventive ligatures; a few whiffs of nitrous oxid for the most timorous or for the most painful procedures, as in taking out bone. He gives an illustration of one man in good health to date five years after removal of an epithelioma of the velum, tonsils and base. There was an interval of three years and a half before recurrence in two other cases of cancer of the tonsil. These were the longest survivals.

**Inguinal Hernia.**—Burian writes from Prague to comment on the large number of hernias that developed during the war, and the frequency of relapses after the routine operative treatment. In sixty-two cases of relapse of inguinal hernia after the Bassini operation, the breach was in the new location of the spermatic cord, which it is difficult to suture firmly. To remedy this, he trains the muscles for two or four weeks before the operation with active and passive gymnastic exercises of the abdominal walls, hips and legs—striving to strengthen the internal oblique in particular. The operation aims to close the hernial sac at the highest possible point; to aid in this he removes all the adipose tissue back of the aponeuroses. He closes the canal by reenforcing the anterior wall with a triple layer of aponeurosis. He passes the catgut through the aponeurosis of the internal oblique and also of the external oblique, back from the edge of each, and fastens them both to Poupart's ligament and to the side lip of the aponeurosis in such a way, as he shows by illustrations, that the side portion of the aponeurosis laps over the median portion. This forms a strong threefold layer of aponeurosis, while the spermatic cord is left in its natural place. Experiences with this technic in hundreds of cases have demonstrated that it is simple, and applicable even to very extensive hernias. The Girard technic is somewhat similar only that the muscle with this is damaged by the suture threads which traverse and strangulate the muscle, and large patches lose their vitality in consequence.

**Loose Shoulders.**—Du-Séjour immobilizes the shoulder in a horizontal plane with the humerus, and has been quite successful with this method in treatment in thirty-two cases of the loose joint left after extensive resection of the shoulder. The immobilization was kept up for two months or more, and then the shoulder was massaged and the new pseudojoint cautiously exercised, with hot douches of the shoulder. The immobilization was kept up for two months with fine results when the deltoid was usable. To save this muscle, therefore, should be the special concern of the surgeon in operating in the shoulder region.

**Restoration of Spongiosa Tissue.**—De Gaulejac and Nathan refer to destruction of the spongiosa from a traumatic hematoma in the bone. Their anatomic and experimental research has demonstrated, they say, that the bone can repair itself at the expense of the fibrous tissue, the collagen of the latter becoming transformed into prebone tissue under the influence of the surrounding bone tissue.

**Restoration of the Parenchyma of the Shaft of a Long Bone.**—De Gaulejac and Nathan affirm that the middle layer, the Haversian layer, of compact bone is the fertile element. This reacts to trauma and inflammation by a return to an undifferentiated stage. If the restraining barrier is broken down, it is capable of proliferating into the adjacent connective tissue. Grafts in this fertile layer in the bone start rapid processes of repair. As the periosteum is so liable to have been injured in the cases of trauma, slices of connective tissue are generally more readily available, but periosteum is preferable on account of its two layers, the loose and the compact tissue.

**Improved Technic for Artificial Anus.**—Malespine remarks that the usual method of fastening the loop so that its branches lie together like the barrels of a gun, has several disadvantages. The feces are liable to get into the lower branch of the anus which the artificial opening aims to prevent. This can be avoided by making a double anus. An incision is made a finger-breadth above the anterior-superior iliac spine, parallel to the crural arch and iliac crest. Two T incisions are then made at right angles to the first incision. They are 4 or 5 cm. long and 4 cm. apart. The flap of skin thus cut on three sides is drawn under the loop of intestine and sutured to the other lip of the incision, thus forming a bridge. Thirty-six or forty-eight hours afterward, the intestine is divided and as the whole heals, the two openings into the bowel are separated by a distance of 3 or 4 cm. The rubber bag receptacle for the fecal matters has two openings to fit over the twin anus openings. In fifty cases in which this "bridge anus" technic has been applied in the last seven years, there have never been any by-effects or mishaps of any kind, and the terminal bowel has been left completely in peace.

## Correspondenz-Blatt für Schweizer Aerzte, Basel

Oct. 9, 1919, **49**, No. 41

*Diseases of Deranged Metabolism. Alfred Gigon.—p. 1529.
Helminthiasis in Children. Paul Lauener.—p. 1539.
*Vacuum Apparatus for Aspiration. Oscar Wild.—p. 1544.
Fracture of Second Cervical Vertebra without Injury of Spinal Cord. F. L. Dumont.—p. 1551.
The Chlorosan Controversy. W. Löffler.—p. 1553. Conc'n.

**Diseases of Deranged Metabolism.**—In the course of this review of his personal observation of cases of deranged metabolism, Gigon remarks that the calory requirements of the body in disease cannot be estimated from the requirements in health. One of his patients with cancer of gallbladder and liver lived for eight months on 600 or 700 calories, and did not lose very much in weight. She weighed 50 kg. to start with. One diabetic patient weighing 78 kg., gained 4 kg. and felt better on 2,000 calories than on a larger amount. The lesser need for calories in these cases is a phenomenon of the disease. In obesity, merely qualitative modification of diet may succeed, as in one case described in which vegetables and fruit were eaten in large amounts, with stationary weight. The woman did not begin to lose weight until the fruit was dropped and butter and three teaspoonfuls of oil taken instead. It is evident that pathologic qualitative

changes in the metabolism play an important part in the metabolism in the obese. The obesity may be of toxic origin, from alcohol, beer or overeating. This latter form is the most amenable to treatment, perhaps. Or, the obesity may accompany or follow some infection. Specific treatment as for syphilis, or a course of arsenic, may prove more beneficial than dieting. A third group is traceable to endocrine disturbance, and organotherapy and dieting are called for. In a fourth group, the central nervous system might be incriminated; psychoses may accompany obesity. Symmetrical deposits of fat in the upper arms, thighs and calves suggest a nervous origin. In a fifth group, the obesity is of the atonic type, with flabby muscles, and often with edema at the ankles, slight anemia, and blood pressure normal or below. Treatment in this form has little chance for success; thyroid treatment brings on heart disturbances. Muscular exercise must be cautious. A salt-poor diet with little fluids is usually helpful.

He declares that the pathologic condition which is exactly the reverse of obesity is as fully a morbid entity as the latter. To keep the balance in weight, an excess of calories is required, 4,000 instead of 3,000. The same causal factors may be involved as with obesity, but the cerebrum seems to be responsible for the graver cases of *Magersucht*—a term he has coined analogous to *Fettsucht*. The action of the brain on the metabolism is too often forgotten, and has not been studied enough. The brain via the liver or other glands with an internal secretion may derange the metabolism, inducing diabetes or obesity or its opposite. In the latter disease, copious drinking has proved very beneficial in certain cases. Whether this is due to washing out of toxins or to modifying the connective tissue so that it will take up fat better, or to other causes, is still a question. In three women there seemed to be an abnormal hydrophilia of the subcutaneous connective tissue, with remarkable dryness of the skin and tendency to chilblains. There was slight improvement under arsenic.

In referring to diabetes insipidus, he remarks on the frequency of psychoses with it. Cases are on record of diabetes insipidus with cerebral syphilis. In the case of one boy of 11, improvement in the diabetes insipidus was realized under long continued administration of one or two tablespoonfuls of cod liver oil. He saw no benefit from strychnin in his five cases. In the physiology of nutrition, albumin plays the most important role, but disturbances in the metabolism of albumin are insignificant, so far as we know to date. It is possible that rheumatism, migraine, skin disease and anaphylactic phenomena may be manifestations of something in this line. Scurvy, rachitis and osteomalacia may also belong in this category. This suggests treatment by measures to modify the metabolism.

**Aspiration Apparatus.**—Wild gives an illustrated description of a simple water-jet aspiration apparatus, with both water and mercury manometer, designed for slow prolonged aspiration with the lowest possible pressure under constant manometer control. It is especially useful for gentle aspiration of the pleura, nasal cavities and pharynx. He has special vacuum cups to fit over the tonsil.

## Chirurgia degli Organi di Movimento, Bologna

September, 1919, **3**, No. 4

Wounds of Large Joints. Metello Francini.—p. 341.
*Traumatic Aneurysms. Giovanni Morone.—p. 363.
*Osteoplastic Resection of Both Feet. Ugo Camera.—p. 401.
*Prosthesis after Idem. A. Serra.—p. 407.

**Operative Treatment of Traumatic Aneurysms.**—Morone gives an illustrated description of five cases of aneurysm after war wounds in which his operative intervention restored clinically normal conditions in the circulation. In a sixth case he merely ligated the popliteal vein as the false aneurysm was a complication of a suppurating process in the knee and fracture of the tibia. Gangrene developed, and the man died from septicemia a month afterward. Suture is preferable to ligation, especially of the "dangerous" arteries (main femoral, popliteal, axillary and humeral). One man with a saclike arteriovenous popliteal aneurysm was cured by resection of the whole, between four ligatures; another by mere evacuation of a hematoma at the origin of the ulnar artery, between clamps. Besides the aneurysmatic hematoma in the popliteal in another case, the artery was obstructed with an embolus. The man recovered after amputation.

**Resection of Both Feet.**—The illustrations of Camera's case show the extensive wounds left by a shell that had carried off both heel regions. He applied the Wladimiroff-Mikulicz osteoplastic technic with excellent results, the man being able to walk on the front fourth of the foot.

**Prosthesis After Osteoplastic Resection of the Foot.**—Serra gives illustrations of the case described in the last abstract after the man had been fitted with a contrivance which provides ample support for the feet, while ordinary shoes are worn just below the tip of the toes. The man is thus made a few inches taller, but there is absolutely nothing to show a trace of the deformity, the trousers showing nothing but the shoes below, and the man is now able to walk well and to dance. Both Camera and Serra regard the results obtained as far superior to those with amputation above the malleoli, the only other resource.

## Policlinico, Rome

July 20-27, 1919, **26**, No. 29-30

*Antibacterial Action of Secondary Rays. F. Ghilarducci.—p. 897.
Necropsy Findings in 200 Children with Influenza. Mancini.—p. 898.
*Syphilis of the Nervous System. Silvio Canestrini.—p. 908.
Remedies Used in Influenza. Ignazio di Pace.—p. 912.
*Index of State of Nourishment. Aleardo Cerioli.—p. 918.

**Antibacterial Action of the Secondary Rays.**—Ghilarducci reports experiments which show in the most evident manner the retarding or suspension of the development of bacteria under the influence of the secondary rays. Lead, tin and silver were the most active on the prodigiosus; copper a little less, iron still less, and aluminum had scarcely any appreciable action in this line. A thin sheet of cardboard interposed absorbed part of the active rays. These findings confirm his previous statements in regard to the bactericidal action of the secondary rays from bismuth and silver salts in the rabbit stomach. The later research obviated the objection that the bactericidal action may have been due to the direct contact with the metal.

**Syphilis of the Nervous System.**—Canestrini remarks that if it were not for the affinity of the pale spirochete for the nervous system, syphilis would not be such a serious disease. It is remarkable that this affinity of syphilis for the nervous system in the form of congenital cerebral syphilis, of tabes and general paralysis is not observed in countries with backward civilization, although syphilis may be widely prevalent there. Düring has related that in his many trips through Asia Minor he never met with a case of manifestations of syphilis of the nervous system among the 10,000 syphilitics he examined. But when these syphilitics from Asia Minor moved to Constantinople to live, a large proportion developed in time tabes or general paralysis. Some have found the cerebrospinal fluid normal only in 22 per cent. of their cases of recent syphilis, and Königstein reported in 1917 that he had found this fluid pathologic in 41 per cent. during the second stage. These findings demonstrate the organic cause for the frequent headaches in recent syphilis. Canestrini called attention in 1911 to the way in which the fluid veered toward normal under arsphenamin treatment of tabes and paralysis, although the subjective and objective symptoms showed no improvement.

From his own experience and review of the literature he is convinced that the action of arsphenamin by the vein is no whit inferior to that of the Swift and Ellis lumbar puncture technic. He describes a number of unusual cases, among them that of an unruly boy of 10 with enuresis and other signs of congenital cerebral syphilis. Under specific treatment the character changed and the symptoms all subsided, except the pupil reactions. He warns not to be misled into giving specific treatment when tabes is merely the work of alcohol or tobacco poisoning. He had a case of the latter kind in a worker on tobacco. He also warns against iodid treatment when there is a possibility of hyperthyroidism, or we may engender exophthalmic goiter superposed on

the syphilis. Tabes dorsalis may develop from inherited syphilis alone. Hösslin has described a case in a virgin of 52. In conclusion Canestrini refers to a case in which a man of 35 had, with other symptoms of syphilis, hallucinations and delirium. After a week of arsphenamin treatment, febrile hemolytic jaundice developed, and as this subsided in two weeks the hallucinations disappeared and the man was restored to comparative health, able to return to work. This intermission lasted for two years, when delirium returned and the man died in a few weeks. Canestrini suggests that the febrile jaundice from retention may have modified the spirochetes in this case, and queries whether it might not be possible to induce a therapeutic hemolytic jaundice by injection of picric acid or of sodium glycocholate or taurocholate.

**Index of State of Nourishment.**—Cerioli divides the weight in grams by the height in centimeters, and accepts the quotient as an index of the state of nourishment exact enough for many practical purposes. The average index from twelve men was about 400 and from twelve women 375.

## Riforma Medica, Naples

Sept. 6, 1919, **35**, No. 36

*Treatment of Kidney Stones. Giorgio Nicolich.—p. 758.
Repeated Cesarean Section in Fifteen Women. S. Delle Chiaje.—p. 760.
Serodiagnosis of Typhus. Lino Urizio.—p. 762.
Medical Treatment in Case of Liver Abscess. T. Silvestri.—p. 763.
Present Status of Operative Treatment of Fecal Stasis. E. Aievoli.—p. 764.

**Operative Treatment of Kidney Stones.**—Nicolich prefers pyelotomy to nephrotomy, for reasons here enumerated, when conditions permit. He opened the pelvis in thirty-three of his 168 operations on kidneys. The youngest of the patients was 11, the oldest 60.

## Rivista di Clinica Pediatrica, Florence

October, 1919, **17**, No. 10

Comparative Growth and Pathologic Anatomy of Twins. Angiola Borrino.—p. 505.
*Localizations of Tuberculosis in Young Children. A. F. Canelli.—p. 523.

**Localization of Tuberculosis in Children.**—Canelli reviews the necropsy findings in regard to tuberculosis in 1,004 children. The findings were positive in 26.6 per cent. and in all but 10.8 per cent. the tuberculosis was directly responsible for the death. No signs of tuberculosis could be detected in 96.3 per cent. of the 766 nontuberculous cadavers. Cheesy or calcified tuberculous lesions in the tracheobronchial glands or in the lungs were evidently the primary localization of the tuberculosis in nearly every case, and in every case in infants under a year old. In only 72 cases was the tuberculosis restricted to a single organ or system, and in this group, to the brain or meninges in 1.9 per cent.; to the intestines in 0.3; to the mesenteric glands in 1.9; to the peritoneum in 1.1, and to the bones in 1.5 per cent. In 195, various organs or systems were involved, the intestine and mesenteric glands in 1.9 per cent.; the glands and meninges in 11.2; bones, lungs and glands in 3.8, and lungs, meninges, liver, spleen and glands in 17 per cent. A cavity had formed in the lung in 4 infants from 6 to 12 months old, and in 20 per cent. of the 35 infants from 1 to 2 years old.

## Rivista Critica di Clinica Medica, Florence

Aug. 9, 1919, **20**, No. 32

*The Antirabies Institute at Florence. A. Martiri.—p. 373.

Aug. 23, 1919, **20**, No. 34

Influenza. C. Cantieri.—p. 397. Begun in No. 33, p. 385.

**Treatment of Rabies at Florence.**—The mortality among the 2,235 persons given preventive treatment during 1916-1918, was 0.13 per cent. In Lumbau's compilation of the records from thirty-two antirabies institutes in different countries the mortality averaged 0.44 per cent.

## Archivos Brasileiros de Medicina, Brasil

June, 1919, **9**, No. 6

The New Tendencies in the Study of the Anatomy and Pathology of the Corpus Striatum. I. Malagueta.—p. 481.
*Treatment of Myiasis. T. De Almeida Junior.—p. 496.
Caution Necessary with Thermal Mineral Waters in Treatment of Disease of the Eyes. O. Correa Netto.—p. 504.

**Myiasis.**—De Almeida relates that inhalation of chloroform will expel maggots and other larvae that have found lodgment in the nose. Myiasis of the mouth, ear or other cavity is not infrequent in Brazil. In three cases among railroad construction workers in 1913, the symptoms caused by the unsuspected larvae in nose or ear suggested meningitis. One man was almost unconscious and could only groan and press his hands to his head. He was treated for meningitis but died the third day, just before death expelling thirty maggots from his nose. There had been nothing, no discharge from the nose, to suggest their presence before. In a second case the nose was edematous and there was a fetid discharge giving the clue. Under inhalation of chloroform and rinsing with diluted chloroform, over 100 maggots were expelled, some still lively, and recovery was complete. In the third case the larvae could be seen in the ear and they were finally driven out by chloroform on a cotton pledget. In another case a young woman complained for twelve days of headache, dizziness, fever and vomiting, and there was a discharge from the nose. On suspicion of a gonococcus process the nose was treated with potassium permanganate without relief, and finally the nasal discharge showed blood admixture. Treatment then with chloroform brought over 100 live larvae, but the maggots had destroyed the tissues so that the tip of the nose perforated, leaving a disfiguring defect. In the fifth case described, the man of 40 was found unconscious beside an empty liquor bottle. To rouse him, camphorated oil was injected and ammonia was held to his nose, and large larvae then began to crawl out of his nose.

## Archivos Españoles de Enf. del Ap. Digestivo, Madrid

September, 1919, **2**, No. 9

*Surgical Treatment of Stomach Disease. V. Pauchet (Amiens).—p. 513.
*Gastric Chemistry. R. Luis y Yagüe.—p. 528.

**Surgery of the Stomach.**—Pauchet analyzes his experience with 1,200 operative cases of gastric and duodenal ulcer, cancer and gastroptosis. Treatment of gastroptosis, he says, requires the cooperation of the physician, the patient, the masseur and—of time, as it has to be a regular course of orthopedics of the abdomen, as with orthopedics of the limbs. In his 30 cases the attempt to cure the gastroptosis failed completely in 6 instances. He found that 75 per cent. of the gastric cancers were located at the edge of an old ulcer, and that 80 per cent. of all gastric cancers are at the pylorus end of the stomach. His experience confirms the advantages of gastro-enterostomy two or three weeks before the gastrectomy. It is better not to wait longer than this as the cancer may progress too rapidly. With movable cancers, the operative mortality after gastrectomy averages 5 per cent. He prefers gastrectomy for gastric cancer even when it can be only palliative. This raises the death rate to 25 or 30 per cent. but the postoperative course is better than after simple gastro-enterostomy, and the survival longer. He says of operative treatment of gastric ulcer that extensive gastrectomy is the preferable treatment, and simple gastro-enterostomy or excision of the ulcer alone is advisable only when there are contraindications to extensive gastrectomy. He describes in detail the technics he advocates for various pathologic conditions in the stomach, defining the indications for each.

**Dissociated Gastric Chemistry.**—Luis applies this term to certain conditions in the secretory functioning of the stomach which he has never seen described elsewhere. The gastric secretion, he explains, is not a simple but a complex activity, varying to adapt itself to the conditions prevailing at the time. There seems to be usually a constant relation between the free and bound hydrochloric acid and the total acidity, but occasionally the free hydrochloric acid is proportionally much above or below the usual standard. The total acidity may be at the normal figure but the proportion between the free and the bound acid may be very irregular and variable, and there may be dyspepsia of the so-called nervous type. The symptoms are those of nervous disturbances, but they

do not fit into the frame of any special neurosis. They render the prognosis more favorable than might otherwise be the case, as they demonstrate the neuropathic or endocrine basis, and guide to appropriate treatment.

## Brazil-Medico, Rio de Janeiro

Jan. 11, 1919, **33**, No. 2, Rec'd Nov. 4

Babesiasis and Anaplasmosis in Cattle. H. de Beaurepaire Aragão. —p. 9.
Acquired Mental Impairment. H. de Brito Belford Roxo.—p. 10.

Aug. 23, 1919, **33**, No. 34

Flagellate Parasite in Intestine of Rhinocricus. G. Hasselmann. —p. 265.
Analysis of Gastric Juice. Helio Ribeiro.—p. 265. Begun in No. 33, p. 257.
Meningitis with Brudzinski's Sign in Child. Perdomo Hurtado.—p. 268.

## Gaceta Médica de Caracas, Venezuela

Aug. 31, 1919, **26**, No. 16

*Hydatid Cyst of the Liver. J. M. García Parra.—p. 165; Idem. L. Razetti.—p. 166.

**Hydatid Cyst of the Liver.**—Razetti comments on the case described by García Parra that it is the first hydatid cyst known in Venezuela, although hundreds of operative cases of amebic liver cyst have been recorded, and at 400 necropsies special search has been made for hydatid cysts, without results. García operated on the assumption that the cyst was in the ovary. The tumor had been slowly developing through five years, and yet had never caused severe local or general disturbances. The description by García is not very clear as to the hydatid origin of the cyst, and Razetti thinks that probably a cystadenoma was mistaken for echinococcus disease, as he has hitherto preached the clinical dogma that hydatid cysts of the liver or of any organ are unknown in Venezuela.

## Medicina Ibera, Madrid

Sept. 20, 1919, **8**, No. 98

Cavity in Structure of the Stapes Bone. Collar Arias.—p. 213.
Urethroscopy: Technic; Diagnosis and Interpretation of Findings. Sicilia.—p. 213.

## Revista Española de Med. y Cir., Barcelona

September, 1919, **2**, No. 15

*The Overvaluation of the Wassermann Reaction. Umbert.—p. 477.
*The Surgery of 1918. J. M. Bartrina Thomas.—p. 482.
*Vaccine Therapy of Malta Fever. J. Durán de Cottes.—p. 495.

**Overvaluation of the Wassermann Reaction.**—Umbert reiterates that only minute clinical examination can be relied on for the diagnosis of syphilis. The Wassermann reaction may fail in the cases in which its aid is most needed, and we must bear in mind that not every affection in a syphilitic is necessarily of syphilitic origin. He lays great stress on the retrospective diagnosis of syphilis by clinical investigation, organ by organ, and examination of other members of the family. The Wassermann reaction generally proves superfluous when this is done.

**Treatment of Wounds.**—Bartrina reviews recent progress in surgery and his own experience in 657 various operations. An illustration is given of one young woman with a large gap in the outer nostril wall. This he reconstructed with a wedge cut from the upper part of the ear. He says of Carrel's method that it is the perfecting of principles long cherished in surgery, but that its application requires great skill and perseverance. It is of transcendental importance in treatment of pleural empyema. Film treatment of burns, on the other hand, is pure empiricism, but its application is rapid, simple and effectual.

**Vaccine Therapy in Malta or Undulant Fever.**—Durán has applied vaccine therapy in over 600 cases of Malta fever since 1906, and states that vaccines should be the pivot for treatment except when the heart and kidneys are the seat of old pathologic processes. These contraindicate vaccine treatment, at least during periods of hemorrhage and extremely high fever. He gives the ether-killed vaccine by subcutaneous injection, usually repeating three or four times, aiming to aid in the complete immunization.

## Revista del Instituto Bacteriologico, Buenos Aires

June, 1919, **2**, No. 2

Serotherapy of Plague; Necessity for International Standardization of Antiplague Serums. R. Kraus.—p. 125.
Influence of Snake Venoms on Coagulation of Blood. B. A. Houssay and A. Sordelli.—p. 151.
Physiologic Action of Spider Poison. B. A. Houssay and J. Negrette. —p. 189.
Heterogenous Hemolysins. A. Sordelli and G. Fischer.—p. 201.
Advantages of Concentration of Antitoxic Serums by A. Homer Method. A. Sordelli.—p. 211.
Proteolytic Action of Snake Venoms. María Julia Otero.—p. 215.

## Revista de Medicina y Cirugía Prácticas, Madrid

September, 1919, **124**, Nos. 1569 to 1572

Prophylaxis of Typhus. D. Amat Ayala.—p. 321.
Pathology of the Skin in relation to Nerve Pathology. E. de Oyarzábal.—p. 353.
Histologic Findings in an Intra-Ocular Tubercle. F. Muñoz Urra. —p. 385.
Ferrán's Vaccination Against Tuberculosis. J. Codina Castellvi. —p. 421.

## Siglo Médico, Madrid

Sept. 20, 1919, **66**, No. 3432

*Gastric Ulcer. R. Luis y Yagüe.—p. 789.
Traumatic Shock. J. Segovia y Caballero.—p. 791. To be cont'd.

Sept. 27, 1919, **66**, No. 3433

*Diabetes Insipidus. G. Marañón and P. Gutierrez.—p. 809.
*Ferrán's Vaccination Against Tuberculosis. Angel Pulido.—p. 814. Begun in No. 3432, p. 785.
*Roentgen Treatment of Hypertrophied Prostate. J. and S. Ratera. —p. 816.

**Gastric Ulcer.**—Luis comments on the frequent absence of actual pain, vomiting and hematemesis with gastric ulcer. Pain in the stomach with digestive disturbance points to ulcer when it is intense and persisting. A boring pain is instructive but is seldom experienced, and then as a rule only with the so-called callous ulcers or those complicated with perigastric inflammation. Vomiting also generally accompanies only chronic ulcer with hyperchlorhydria, and preeminently those ulcers near the pylorus. In itself, vomiting has little diagnostic value.

**Pituitary Insufficiency and Diabetes Insipidus.**—Marañón and Gutierrez present evidence to prove that the cerebrospinal fluid is a factor in polyuria but not by its chemical ingredients—its hormone content, as some believe—but by a mechanical action from its high pressure. Among their arguments are that normal cerebrospinal fluid does not modify the output of urine, and neither does injection of this fluid from a person with diabetes insipidus. No influence on diabetes insipidus was observed after intraspinal injection of pituitary extract. If persons with diabetes insipidus were injected subcutaneously or intraspinally with normal cerebrospinal fluid instead of pituitary extract, this would be further evidence but no one has attempted this. The above testifies, they say, that the oliguria-inducing hormone does not pass into the cerebrospinal fluid, but withdrawal of some of the fluid to reduce its pressure favorably modifies diabetes insipidus. In one of their own three cases the output of urine dropped from 5,600 to 3,200 after escape of 40 c.c. of lumbar puncture fluid; in the second case the output dropped from 12,000 to 8,700. In the third case, the drop was only 150 gm. If any oliguric hormone actually passed into the cerebrospinal fluid, the output of urine would naturally increase, instead of dropping, after withdrawal of a portion. The hypertension is the work of the pituitary tumor, but in turn it hampers the functioning of the still functionally capable portions of the pituitary, thus setting up a vicious circle.

**Ferrán's Vaccination Against Tuberculosis.**—See Madrid Letter, October 4, p. 1074.

**Roentgen Treatment of Hypertrophied Prostate.**—Ratera reports fifteen cases of hypertrophied prostate in which systematic deep roentgen treatment was followed by subsidence of the gland, even when it seemed to present features of an adenomyoma. He warns that cystitis may apparently develop under the treatment, but that this in reality is merely the breaking through of abscesses already in the prostate tissue. This was demonstrated beyond question in one of his cases. The best results are obtained when the bladder

still retains normal contracting power. The exposure through the coccygeal region seems the preferable technic, alone or combined with exposure of the perineal region. The tissues are no thicker for exposures from two points, each side of the tip of the coccyx, than from the perineum, while the posterior aspect of the prostate presents a better surface for raying from the rear, instead of raying from pole to pole. In two of his cases, transient retention of urine followed, evidently from the reaction of the prostate tissue, and the urine was turbid and bloody for some time. The usual dose was 5 H units per zone, once or twice a month, filtered through 3, 4 or 5 mm. of aluminum. In some cases they gave up to 10 or 15 units per field, with thick filters, but in this case the intervals had to be two or three months. No reaction in the skin was observed in any case.

## Mitteilungen aus der Med. Fak. der Univ. zu Tokyo

May 12, 1918, **19**, No. 4

*Pathogenesis of Epithelial Cancers. K. Yamagiwa and K. Ichikawa.—p. 483.
Alimentary Glycosuria in Phosphorus Poisoning. T. Ishikawa.—p. 497.
Causes and Nature of Heat Stroke. C. Koizumi.—p. 525.

July 13, 1918, **20**, No. 1

*Action of Pituitary Extract on Puerperal Uterus. M. Shiraki.—p. 1.
*Changes in Mouse Mammary Glands after Injection of Scarlet Red. M. Takeuchi.—p. 47.
*Influence of Immunizing Processes on Sugar Content of Blood. K. Sakaguchi, I. Hayashi and S. Yezima.—p. 61.
*The Sinus Node with Constantly Irregular Pulse. S. Yamada.—p. 85.
Study of Pancreas Functioning. Z. Hatta and K. Marui.—p. 121.

**Pathogenesis of Epithelial Cancers.** — The preceding research of Yamagiwa and Ichikawa has already been mentioned in these columns. At date of writing (April, 1918) they had a record of 16 well defined carcinomas developing on rabbit's ears systematically painted with tar. In 26 other cases incipient carcinoma had developed, and in 23 others there was carcinoma in a transitional phase. The shortest interval before the well defined carcinoma developed was 103 days, and the longest, 565. In only 3 instances was the development of metastases noted. One important practical conclusion from their research is obvious, namely, that carcinoma does not begin as such but passes through the phases of atypical development of the epithelium, follicular epithelioma, and finally carcinoma, and also that the carcinoma may in time have to yield to encroaching connective tissue and thus be compelled to retrogress and heal. Their findings seem to show that the physiologic epithelium cells are like a newly born babe whose character can be trained to good or to evil according to the training and environment in which it grows. The repeated tar applications can influence the cell until it becomes malignant. The cell once become malignant cannot return to its former physiologic state but it may succumb to the encroachments of connective tissue.

**Action of Pituitary Extract on the Puerperal Uterus.**—Shiraki gives fourteen comprehensive full-page tables of his findings, with over three pages of bibliography. Among the practical conclusions of his research are the warning that pituitary treatment should not be given unless the fetal head is in a proper position to stand the resulting contractions of the uterus; unless the proportions between the size of the head and of the pelvis are comparatively normal; and unless the os is open at least 5 cm. as otherwise the powerful spasmodic contractions of the uterus might strangle the fetus or rupture the uterus, especially as under the induced contractions it is a difficult matter to deliver the child rapidly when haste is imperative. As a rule, the success in the expulsion phase is the more certain the lower the fetal head is at the time.

**Changes in Mouse Mammary Glands Under Injections of Scarlet Red.**—Takeuchi found the changes much more pronounced in the male than in the female mamma, but no tendency to actual malignant transformation could be detected.

**Blood Sugar During Immunization.**—The twenty-two horses examined showed very little fluctuation of the blood sugar content through the years, even when the horse was being used for production of diphtheria antitoxin. Similar lack of fluctuation was noted in rabbits treated with diphtheria antitoxin.

**Constantly Irregular Pulse.**—Yamada tabulates the minute details, clinical and necropsy, in thirty cases, including four from his own practice, with seven photomicrographs of sections of the sino-auricular node. The latter was usually pathologic, but in 13.3 per cent. of the cases it seemed to be free from fibrosis.

## Hospitalstidende, Copenhagen

Aug. 27, 1919, **62**, No. 35

Micromethods for Determination of Sugar Content of Blood and Urine; the Residual Reduction. R. Ege and O. Rasmussen.—p. 993.

## Hygiea, Stockholm

Sept. 16, 1919, **81**, No. 17

*Mechanism for Speech, Music and Calculation, and Their Localization in the Brain. S. E. Henschen.—p. 721.

Sept. 31, 1919, **81**, No. 18

*Sugar Content of Blood in Diabetes Mellitus. S. Lindblom.—p. 753.
Polycythemia and Enlargement of the Spleen. Harald Öhnell.—p. 761.

**Mechanisms for Speech, Music and Calculation.**—Henschen presents arguments to prove that some psychic phenomena form to a certain extent an independent entity, a psychic functional complex. This has an anatomic basis, he explains, formed of certain cortical centers connected by association paths. Both anatomically and functionally one complex may drop out without influencing any of the other complexes. He cites numerous instances to show the interworking of the higher psychic coordinating centers with the lower mechanism, and the correlation between the different complexes, as, for example, between music and speech. A man may be able to sing to a melody certain words but is incapable of speaking the words separately. From the clinical and anatomic data on record in regard to aphasia, etc., Henschen deduces that the left hemisphere of the brain is chiefly responsible for elaborating into ideas the material accumulated by the senses. He suggests that this more complete development of the left hemisphere is an inherited property. He has noticed in ancient and modern art that the left half of the skull is often more prominent, as in the sculptured head of the Young Augustus. Comparison of sculptured heads suggests that the prominence of the left half of the skull testifies to the sculptor's having worked from a living model. It is important from the standpoint of physiology and heredity, he adds, to determine whether this hypothesis is correct. In conclusion he reiterates that study of aphasia and similar complexes allows us a glimpse directly into the mechanism of the mind, and offers a promising field for reseach on the psychic life.

**Sugar in the Blood in Diabetes.**—Lindblom theorizes that hyperglycemia to a certain extent is a useful phenomenon in diabetes. It serves to warn the sugar-forming and the sugar-destroying organs that formation of sugar must be reduced or the destruction accelerated to restore an approximate balance. The organs gradually become less sensitive to the hyperglycemia, while the ability of the kidneys to eliminate sugar grows less. The urine may be freed from sugar on a proper diet, not in spite of the hyperglycemia but thanks to this. But, of course, hyperglycemia is injurious on the whole, so that efforts to keep it down are indicated, and avoidance of carbohydrates is rational.

## Svenska Läkaresälliskapets Handlingar, Stockholm

Sept. 30, 1919, **45**, No. 3

*Fractures of the Lower End of the Forearm. Abraham Troell.—p. 339.

**Fractures of the Forearm.**—Troell reproduces eighty-one fine radiograms showing the three main groups of fractures of the radius close to the wrist. He discusses the mechanism in each type and the treatment, and emphasizes the differences which are evident between the cases with completed ossification and those in which ossification processes are still under way. His article is based on 200 cases personally observed and followed, and he compares his findings with Pilcher's and others'.